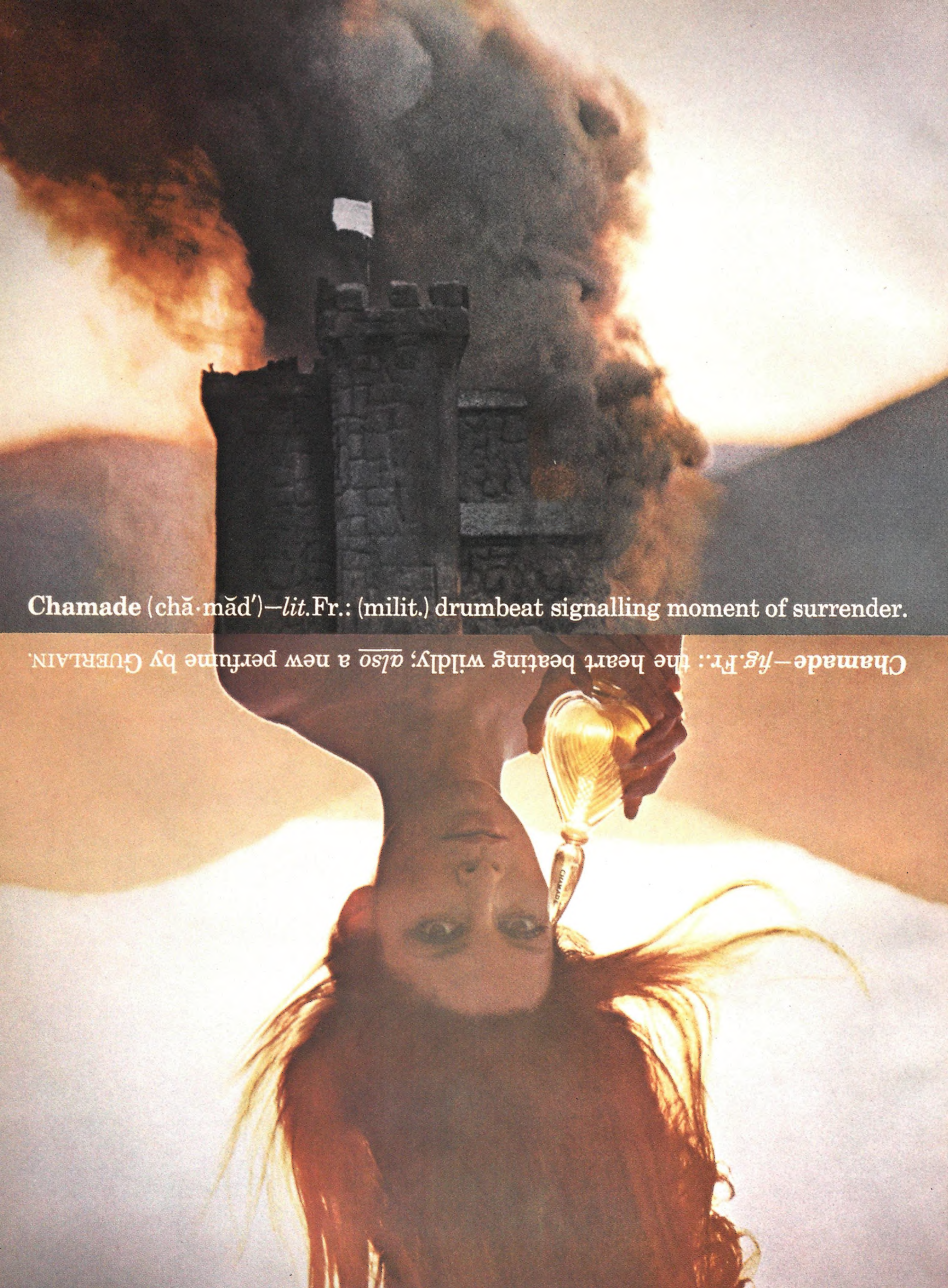
May 1972

Smithsonian

The Smithsonian's *White Cloud*, by George Catlin, has gone to Los Angeles for an important show of Western art (p. 36)


Chamade (chă·măd′)—*lit.*Fr.: (milit.) drumbeat signalling moment of surrender.
Chamade—*fig.*Fr.: the heart beating wildly; *also* a new perfume by GUERLAIN.
CHAMADE

A lot of people who always wanted to run their own companies work at 3M.

What is it that makes a customer prefer dealing with someone who runs his own business?

You know from your own experience. The man who's working for himself really works for his customers. By offering service before he's asked for it, by getting personally involved in projects, by following through.

Basically, the person who runs his own business has everything to gain by making you happy. What makes him a success is helping make you a success.

The only trouble is, the very things that make a man good at running his own company—ambition, inspiration, forcefulness—often make him very unhappy working for someone else's company.

But if a company can take advantage of those entrepreneurial instincts, and combine them with the guidance and resources of an established organization, then you have something very special going. And that's what we've done.

Which is why at 3M, it is possible for a man to start out with, for example, a business idea, and wind up heading a division manufacturing a product his idea contributed to.

If this is an unusual notion, it is only because 3M is an unusual company.

We start with the proposition that people are individuals, and nobody can ever know what any individual can accomplish if he's not given some latitude. So while most companies are concerned with how good people are at fitting into jobs, 3M is concerned with how good people are at growing out of them.

The results have been very good indeed. Putting emphasis on the individual—and especially the entrepreneurial individual—is one big reason 3M has come up with products like the first commercial color-in-color copier and reflective sheeting for license plates.

The Great American Entrepreneur. Let's hope he never disappears.

There's at least one company where he won't.

3M COMPANY

People still count here.

Be sure to watch Harry Reasoner on 3M's ABC-TV special *Who Do You Think You Are?* on May 8th. Consult local listings for time and channel.

3M Co., 3M Center, St. Paul, Minnesota 55101

Secretary of the Smithsonian Institution
S. Dillon Ripley

Editor
Edward K. Thompson
Board of Editors
Ralph Backlund, Edwards Park,
Grayce Northcross, James K. Page jr.
Assistant Editors Sally Scott Maran, Caroline Despard, Judith Tripp, Marlane Liddell
Art Direction John Beveridge
Advertising Director Thomas H. Black
General Manager Joseph J. Bonsignore
Production Nannie Clay Shanahan
Business Carey O. Randall
Circulation-Promotion Director Anne Keating

Board of Regents
Smithsonian Institution

Ex Officio
Chief Justice of the United States
Warren E. Burger, Chancellor
Vice President of the United States
Spiro T. Agnew

Appointed by the President of the Senate
Honorable Clinton P. Anderson
Honorable J. William Fulbright
Honorable Hugh Scott

Appointed by the Speaker of the House
Honorable Frank T. Bow
Honorable George H. Mahon
Honorable John J. Rooney

Appointed by a Joint Resolution of Congress
Dr. John Nicholas Brown
Dr. William A. M. Burden
Dr. Crawford H. Greenewalt
Dr. Caryl P. Haskins
Mr. Thomas J. Watson jr.
Mr. James E. Webb

National Board of the Smithsonian Associates
Mr. Thomas J. Watson jr., Chairman,
Mr Harry H. Bassett, Mr. William Blackie,
Mr. John W. Brooks, Mr. Richard P. Cooley,
Mr. Joseph F. Cullman III, Mr. Harry B. Cunningham
Mr. Paul Davies, Mr. Leonard K. Firestone,
Mr. Charles T. Fisher III, Mr. G. Keith Funston,
Mr. Alfred C. Glassell jr., Mrs. David L. Guyer,
Mr. Ben W. Heineman, Mr. Henry J. Heinz III,
Mr. William A. Hewitt, Mr. Lewis A. Lapham,
Mr. Frank Y. Larkin, Hon. George C. McGhee,
Mrs. Robert S. McNamara, Dr. Reuben P. Mettler,
Mr. Roger Milliken, Mr. Francis C. Rooney jr.,
Mr. Merritt K. Ruddock, Mrs. Henry P. Smith III,
Mr. James O. Wright

Smithsonian is published monthly by the Smithsonian Associates, 900 Jefferson Drive, Washington, D.C. 20560. © Smithsonian Institution 1972. All rights reserved. Reproduction in whole or in part without permission is prohibited. Subscription price $10 a year in U.S. and possessions, $11.50 elsewhere. Single copy price $1.00. Second class postage paid at Washington, D.C. Editorial offices, 900 Jefferson Drive, Washington, D.C. 20560. Advertising and circulation offices at 420 Lexington Ave., New York, New York 10017. Please address all subscription correspondence and change of address information to P.O. Box 2928, Boulder, Colorado 80302.

May 1972

Smithsonian

Volume 3, Number 2

Table of Contents

COVER: Portrait of White Cloud (called the "Prophet"), an adviser to Black Hawk, a Sauk chief in the Illinois rebellion of 1832. The painting by George Catlin is from the National Collection of Fine Arts (see p. 36)

4 The view from the castle: Secretary Ripley discusses a bequest—Smithsonian's Chesapeake Bay Center

6 Letters to the Editor

10 Short-lived phenomena: foxes attack snowmobiles, case for divining rods, do two wrongs make a right? the return of the blimp

16 Professional foresters use nature's way to prove forest fires are not all bad but sometimes a safeguard despite Smokey the Bear's admonitions
By Robert Claiborne

24 Five of the world's rare birds can be found (at least for now) on the Indian Ocean's Seychelles Islands
Photographs by Terence Spencer, George Holton and George Watson

32 A Smithsonian exhibit shows why ballooning's joys are, as in times past, once more on the rise

36 In a new exhibition of paintings and sculpture, the old West, as seen by artists of the time, is recaptured at the Los Angeles County Museum of Art
By Frank Getlein

46 Proving we are the stuff of which stars are made, evolutionists trace the earliest chemical steps to life in laboratories and outer space
By Irene Kiefer

54 A Mt. McKinley attack on trash
By Doris M. Ewing

58 The violent war between Man and whales—up to their present endangered status
By J. David Truby

66 How Leningrad was restored
By Vivian Craddock Williams, photographs by Ian Yeomans

74 Three working-class women launch a campaign to clean up one of the most polluted regions in England
By Donald Gould

79 Book reviews

84 May events at the Smithsonian

88 Some tantalizing torments and Sisyphean sentences
By Patrick Ryan

WE WANT YOU TO BE ABLE TO CONTROL YOUR INSECT PROBLEMS WITHOUT DAMAGING THE ENVIRONMENT

FOR THIS REASON, in our line of RAID flying insect control products, we adopted only the safest of all known insecticides, the Pyrethrins, plus such non-persistent synthetics as Neopynamin and d-trans-Allethrin, as active ingredients.

To control crawling insects such as roaches effectively, a product must have some residual effect. We make such products for those who have need of them. But we make them with carbamate and organophosphorous active ingredients, all of which degrade rapidly enough to pose minimal environmental hazards to plant, animal and bird life.

Further, we recommend that our

products be used only for in-home and near-home situations, such as private yards and gardens.

Finally, we do not use DDT, Lindane, Dieldrin, or other "hard" chlorinated hydrocarbons, in any of our products.

We want you to be able to control your insect problems.
But not at the expense of our environment.

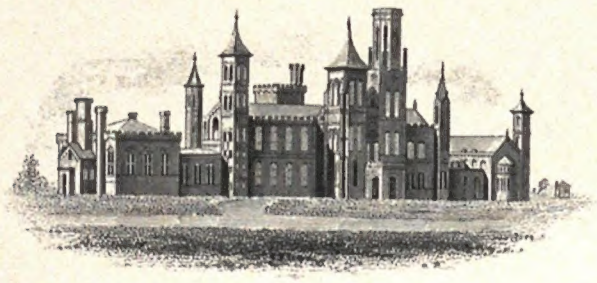
Raid®

S. C. Johnson & Son, Inc., Makers of Raid Insecticides

©1971 S. C. Johnson & Son, Inc., Racine, Wisconsin 53403 Printed in U.S.A. All rights reserved. RAID is a trademark.

Secretary Ripley's comments

The view from the castle



As the result of a bequest, the Smithsonian has a temperate-zone research center for ecological studies on Chesapeake Bay

In 1962 Robert Lee Forrest of Baltimore died, willing his estate to the Smithsonian. This beneficence was totally unexpected for he had made only one or two known visits to the Institution and had been something of a recluse in his last years. Besides substantial cash and securities, Mr. Forrest's estate included the ruins of a former model dairy farm on the western shore of Chesapeake Bay in Anne Arundel County, Maryland. In 1965 the Board of Regents approved the request to retain this 368-acre tract. In 1966 we added a neighboring property on the Ivy Neck Peninsula, belonging to Miss Adelaide Colhoun, whose family had owned and lived on the land since the late 18th century. We were then in a position to establish a center for ecological research and education—the Chesapeake Bay Center for Environmental Studies.

At our Chesapeake Bay Center, there is a mix of cultivated fields, abandoned farm land, second-growth woods and stands of trees of varying ages, including some mature ones. The Center protects the estuarine shoreline of a single small watershed, including some land badly disturbed by farming, dumping and other activities, as well as virtually undisturbed areas. All of this, with a large expanse of bay and estuary, provides opportunity to study in depth some of the problems that bedevil us today: how to preserve our real wellsprings, our marshes, the seats of life, the core of the age-old renewal and rebirth without which we are undone. Over the years this can be a most vital laboratory for the Smithsonian and for universities.

At Ivy Neck, a dirt road winds down through sumac borders and scrub oak and maple to the shore. Glimpses of blue water, glancing in the sun, occasionally shimmer through the trees. Long before one can see them clearly, the garrulous clangor of swans fills the air. Finally they are revealed, noble, majestic, a white sheet of whistling swans spreading across the nearer reaches of the Bay. (In winter, the Chesapeake Bay is home to the largest concentration of whistlers on the Eastern Seaboard.) Though not far from motorboats and duckblinds, these birds always seem to me the epitome of wilderness. They come and go on their own, without a passing glance at mere man. In 1970 a research team from Johns Hopkins learned that our Chesapeake Bay swans summer off the north slope of Alaska, thus making their 7,000-mile round trip one of the longest known.

To read in the newspapers, last fall, that people wished to shoot swans in season depressed me mightily. Swans are not good to eat, they are merely noble—more noble than most aspirant hunters. To kill a swan, as I have written elsewhere, is to impinge on your birthright, to scar your soul a little.

With the cooperation of a small band of research workers and devoted neighbors, and with a heartwarming response from foundations, the Smithsonian now has fallen heir to, or purchased, or covenanted for, some 2,500 acres of mixed greenbelt and estuary on the western shore. In the next 50 years we should be able to play our appointed part in learning some of the limits of tolerance for our environment, and contribute in a substantial way to the management of a vast national resource, the Chesapeake Bay.

S. Dillon Ripley

For four generations
we've been making medicines
as if people's lives depended on them.
Lilly
ELI LILLY AND COMPANY, INDIANAPOLIS

Letters to the Editor

Presidential style

Dear Sir: In Emmet John Hughes' article in the March issue on the style of the Presidency, Woodrow Wilson is quoted as saying, "The President is at liberty, both in law and conscience to be as big a man as he can." I believe the role of "being as big a man as he can"—in constructive promotion of the public interests—must be the goal of all who hold office and of all citizens who genuinely care.

The vital factor in every campaign and in all aspects of life is leadership. Lack of leadership—in homes, in schools, in communities and at higher echelons—underlies most problems, including the unproductive sacrifice of American blood in questionable wars, the pollution of the biosphere, the self-destructive misuse of narcotics by misdirected youngsters, poor relations between the races, the increasing incidence of crime and complications in developing public transportation.

As Mr. Hughes notes, "the style of a President" readily "fills a void"; the same thought applies in the cases of lesser officers, of voters, of parents and of educators. If your article has generated such thoughts in 100 minds, you have performed a public service.

William L. Knaus
St. Paul, Minnesota

Lessing Rosenwald

Dear Sir: Author Meryle Secrest seems to have found the essence of the legendary Lessing Rosenwald, collector of master prints. He is described as we in the Philadelphia area know him: a man with a brilliant mind, a warm heart, a generous nature and a very human approach to art.

What was not mentioned, and perhaps not known, is that his former home, the old Alverthorpe Manor, has been inhabited by the Old York Road Art Guild for nearly two years. Our educational and cultural work extends into the surrounding counties and our shows include artists from all over the Delaware Valley. Next season, we plan to include classes in printmaking. Your article only reinforces our motivation to attain the highest standards inspired by a man in whom we all take pride.

Mrs. Muriel Haac
President, Old York Road Art Guild
Jenkintown, Pennsylvania

Jersey wetlands

Dear Sir: In your article, "Making peace with the marshes of New Jersey," the full-page picture of cordgrass is a masterpiece. The rhythm and shading is almost unbelievable.

Mrs. Helen R. Coates
Lemon Grove, California

Hypnosis

Dear Sir: As a clinical psychologist, I am aware of some hazards in hypnosis about which I think the authors of your article might have been more serious. I have case material which suggests that hypnotic suggestions, whether *post* or otherwise, may continue feedback over long periods of time.

Virginia Johnson
Los Angeles, California

Dear Sir: It seems to me there is a parallel between hypnosis and a certain kind of neurosis. In each case the individual's conduct is not under his personal control, and does not proceed from the exercise of his personal desires.

Renunciation of volition has an awful attraction for many people and is a popular solution to the vexing question of how to live one's life. A much-favored device for avoiding it is to indenture oneself to an "authority." If one does not dare to make any evaluations on one's own cognizance, it is no trouble at all to accept a logical incongruity, or a lie, or anything else. Failure to consider one's feelings tends to enfeeble them, and by default the opinions of others seem endowed with such an admirable validity and respectability that one is excused from having one's own wretched opinions at all.

Sadie Long
New York City

Illegal art

Dear Sir: Regarding your article on traffic in illegal art treasures, I feel many of the countries that are showing so much concern for their treasures being returned would do better to sell them to people who would take care of them. I noted, for example, that the Vatican is crammed with treasures in all stages of decay and displayed so poorly that they might as well be under a sheet. I consider them a part of world history and therefore other nationals are entitled to see such treasures—displayed properly.

Marvin J. Allison
Richmond, Virginia

Patrick Ryan

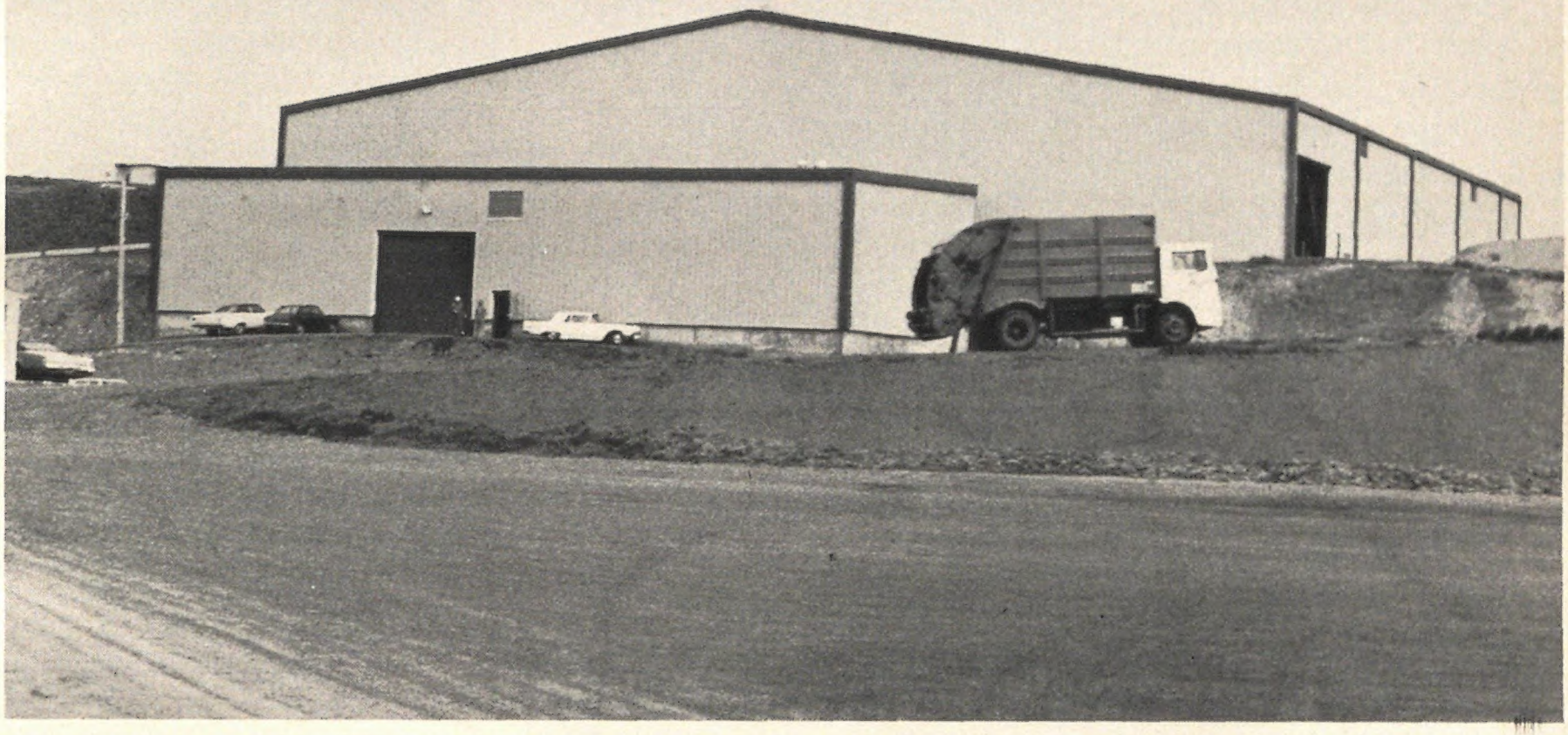
Dear Sir: In Mr. Ryan's article, "Your happy taxonomist uses 39 words to say 'dog,'" we are reminded that Mankind is the villain in much of the extinction process. But why not credit us with some of the new species and varieties.

Take dogs, to continue your example. Let's elevate *familiaris* to the unused subgenus and name our basic breeds as species and subspecies. Naturally, dogs should be named in Dog Latin. Names come easily to mind: *Tenacious tenacious*—the English bulldog; *Rambunctious rambunctious*—the fox terrier; *Lupus familiaris*—the German shepherd.

Dr. Winfield Massie
Waverly, Virginia

Dear Sir: It is clear that Patrick Ryan lacks background or knowledge of systematics (taxonomy). As a zoologist, I would like to point out that scientists in the field do not use 39 words to *say* "dog"; they use only two. Ryan doesn't understand that when he uses the word "dog" he could mean any of several species of canids, including for example *Atelocynus microtis* (the small-eared dog) and *Nyctereutes procyonoides* (the raccoon dog). The other words (making up the alleged 39) are names at various levels in the hierarchy of categories (a system of classification, *not* a system of naming). Take, for example, the category Subphylum with the name Vertebrata—the

Palazzo Della Immondizia



English translation: Palace of Garbage

Ecological translation: 250,000,000 steel cans recovered a year

In San Francisco garbage collectors call it the Palazzo Della Immondizia. Ecologists call it a solid waste transfer and separation station. In any terms, it is one answer to the country's growing problem of what to do with household refuse.

More than 150 collection trucks an hour dump their loads in it. The garbage is then transferred to larger trucks and taken to a sanitary landfill site in Mountain View, 32 miles away. (San Francisco, surrounded on three sides by water, years ago ran out of places to put its garbage.) In four years, Mountain View will have a 500-acre recreation area, with a golf course, marinas, tennis courts, picnic areas.

By July, the Palazzo Della Immondizia will have in operation a magnetic separator. It will salvage an estimated 250 million steel cans a year, which will be sold to the copper industry to extract copper from low-grade ore.

Everyone benefits. San Francisco householders simply throw their used steel cans in their garbage pails. The salvaged cans generate revenue. San Francisco has a place to put its refuse. Mountain View will soon have a new recreation area. Old steel helps produce more new copper.

In San Francisco, garbage is beautiful.

Steel
the recycled material

Tinplate Producers
American Iron and Steel Institute

Armstrong's

PROUDLY PRESENTS

pegasus

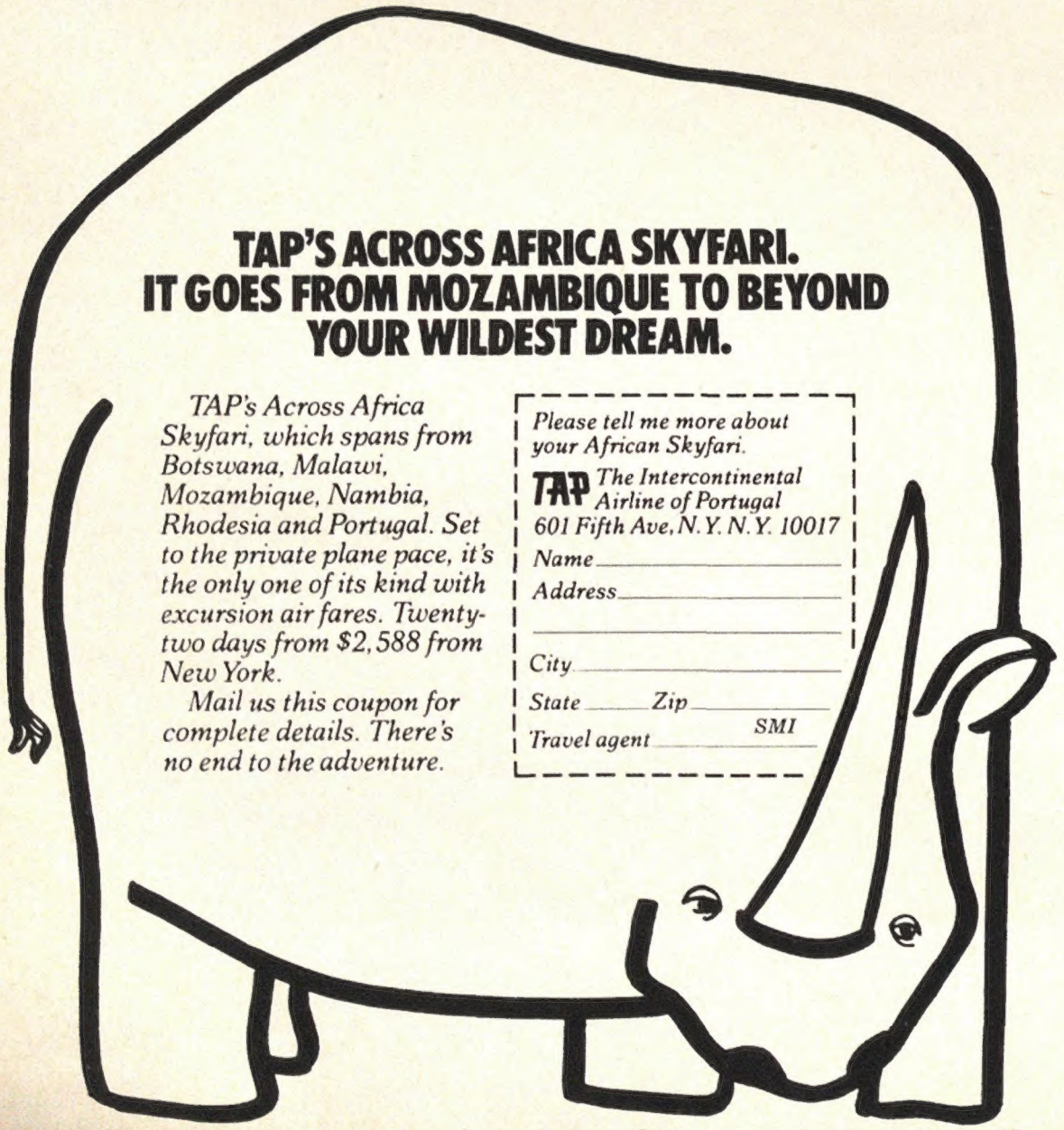
BY CYBIS

This magnificent winged horse of Greek Mythology, a limited edition of 500 pieces, was created especially for you through the genius and devotion of the artists at the Cybis Studio.

We at Armstrong's are proud of the fact that we have the largest selection of collectors' porcelains in the Western United States. We have over 200 different pieces of porcelain in stock for immediate delivery and we deliver anywhere within the United States. Your inquiries are invited.

Armstrong's Price $1,450.00

150 East Third Street • Pomona, Calif. 91766 • (714) 622-4535


TAP'S ACROSS AFRICA SKYFARI.
IT GOES FROM MOZAMBIQUE TO BEYOND
YOUR WILDEST DREAM.
TAP's Across Africa Skyfari, which spans from Botswana, Malawi, Mozambique, Nambia, Rhodesia and Portugal. Set to the private plane pace, it's the only one of its kind with excursion air fares. Twenty-two days from $2,588 from New York.
Mail us this coupon for complete details. There's no end to the adventure.
Please tell me more about your African Skyfari.
TAP The Intercontinental Airline of Portugal
601 Fifth Ave, N.Y. N.Y. 10017
Name
Address
City
State Zip
Travel agent SMI

Prices according to day and season of travel. Price based on G.I.T. economy class fare, minimum 15 persons traveling together.

one name "Vertebrata" tells us more details about the "dog" than several books can contain: It tells us the dog has a backbone, making it, therefore, more closely related to us then, say, to a beetle. If books full of scientific knowledge can be brought immediately to mind with one word of a classification system, I don't think Ryan's "a bit extravagant" is applicable.

Terry L. Edwin
Washington, D.C.

Short-lived phenomena

Dear Sir: The paragraphs on "very natural gas" suggest that "the manure from a feed-lot producing 100,000 cattle could supply the natural gas needs for 30,000 people, thereby alleviating a burdensome problem of solid-waste management in the bargain." Solid "waste" in the past has been more boon than burden.

I remember that local garden shops maintained a brisk trade in cow manure for one dollar a bushel. I wonder how the price tag on the methane would compare.

Donald E. Hale, M.D.
Coronado, California

Mr. Hinrich L. Bohn, associate professor in the Department of Agricultural Chemistry and Soils at the University of Arizona, feels that the price would be competitive. He also pointed out in the December 1971 issue of Environment *that after the methane had been extracted, some 20 to 50 percent of the original solid waste would be left over, still suitable for fertilizer.* Ed.

Bicycles

Dear Sir: My husband and I are new subscribers, and the February issue was the first we received. It appears to be a great magazine, except for the cover. Could we please have one magazine purported to be an intellectual magazine without "girlie" photographs on the cover?

Jean Fabert
San Francisco, California

Dear Sir: As a subscriber to SMITHSONIAN, I wish to compliment you on your choice of the cover for the February issue. At the end of winter and the beginning of another spring, your girl and bicycle are uplifting and refreshing.

Glenn W. Epplé
Warrenville, Illinois

The History of America in the Crucial and Exciting Years of the Civil War

is told in the pages of

Civil War Times ILLUSTRATED

The American Civil War, its prelude and its aftermath, spanned one of the most colorful periods in the history of the United States. Fiction has not paralleled its exciting stories, nor has time dimmed the fascination this period holds for lovers of history around the world.

The story of those years is told in a lavishly illustrated, excitingly written magazine which you will both enjoy and treasure. The name of the magazine is CIVIL WAR TIMES *Illustrated*. Sometimes in a single-subject issue, but usually in an issue highlighting many people and many events, this magazine of history sweeps across the calendar of a decade to tell the ever-engrossing story of America and Americans caught up in the excitement and turmoil of the 1860's. More than half a million Americans died in this struggle over the question of states' rights and slavery. Hundreds of battles were fought in a war that had wide international repercussions at the time and that molded the young country into a truly *United* States.

CIVIL WAR TIMES *Illustrated* has been published ten-times a year since 1962 in Gettysburg, Pennsylvania, the town around which raged for three days the biggest and most pivotal battle of the war, the same town where Abraham Lincoln later delivered his brief-but-famous "Gettysburg Address."

Annual subscriptions are regularly priced at $10. As a reader of *Smithsonian,* you may enter your subscription at the special low rate of only $8.50. Thus, at a savings of $1.50, you may become a regular subscriber and receive and enjoy the next ten issues of this fascinating, accurate and non-partisan magazine of history.

CIVIL WAR TIMES *Illustrated*
206 Hanover Street, Gettysburg, Pennsylvania 17325

Please enroll me as a subscriber to CIVIL WAR TIMES *Illustrated* at the special low rate of $8.50, saving me $1.50 off the regular subscription rate of $10,and send me the next 10 issues of the magazine. I understand that if the first issue I receive does not live up to my expectations that I may cancel this subscription without further obligation.

Name _____

Address _____

City _____ State _____ Zip _____

6111

Field trips to
EAST AFRICA

Photo by Louise Bucknell

with people who care deeply and are committed to its preservation.

Three-week tours into UGANDA, KENYA and TANZANIA

You "see" things, but what do they mean?

From headwaters of the Nile to the Indian Ocean, interpretive leaders will show you what to look at, how to "see" it, and what it means. A leisurely pace in uncrowded cars; animal and bird watching in the great national parks and game reserves; meetings with representatives in various fields.

Finest accommodations and services. Generously inclusive price (including tips) with round trip air from New York. **$1585**

Year Round Departures
June, July, August, add $50

For brochure, see your travel agent or write to

National Parks and Conservation Assoc.
Travel Desk, 18 East 41 St., N.Y., N.Y. 10017
• (212) 532-7075

Please send your East Africa brochure to

Name_____

Address_____

City_____ State_____ Zip_____

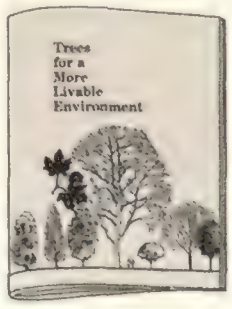
Trees.

Will we ever really know enough about them?

A quite remarkable little booklet seems to suggest that we're making progress.

It's called, "Trees for a More Livable Environment," and it concerns itself with the selection and maintenance of trees for the urban landscape. It looks at trees and their many functions from a community level. What it says in effect is, "Don't just choose a tree, choose a sensible tree for the intended purpose."

We'd like you to have this booklet with our compliments. Just send your name and address on a postcard to Tree Booklet, Dept. S. I., Ortho Division, Chevron Chemical Company, 200 Bush Street, San Francisco, California 94120.



Chevron

ORTHO Chevron Chemical Company

Short-lived phenomena

Blimp fans take another flier, dowsing is proved (almost) and foxes attack snowmobiles

When the first report of a gray fox attacking a snowmobile reached the New York Environmental Conservation Department, it may well have sounded like the start of an overdue rebellion against Man's latest egregious affront to wildlife's peaceful realms. No such luck.

Throughout the last days of February, the department received further Sullivan County reports telling of foxes foaming at the mouth and attacking dogs and cars as well as snowmobiles; of foxes appearing lethargic, lying around oblivious to humans; and of foxes dying near peoples' homes. Rabies was immediately suspected by a nervous public, but pathologists found no sign of the disease. The cause was canine distemper, which over the years had been known to occur only in isolated instances among foxes and other carnivores in this southern Catskill area.

By early March, the department reported to the Smithsonian's Center for Short-lived Phenomena that the distemper outbreak had spread into other counties to the north and south, and there were reports of gray foxes dying across the border in Pennsylvania. It had also killed a few red foxes, raccoons and skunks. Judging from tracks in the snow, the gray fox population—assessed as relatively high this year—has decreased greatly since the distemper outbreak.

By the middle of March, 60 cases altogether had been documented, and Dr. Ward B. Stone, the wildlife pathologist in New York's Wildlife Research Laboratory, believed that many more had died unseen in less-traveled areas. This was the breeding season for the gray fox, and the more frequent contact between them accounts for the spread of the disease, according to Dr. Stone. He suggests that canine distemper may have long been a "limiting factor" on gray fox populations, just as sarcoptic mange is for red foxes. The reason why this has not been noticed until now, he says, is that fish and game departments simply have not been very much interested in foxes, since they are not game animals.

A case for divining rods

Skeptics have long hooted with derision at the ancient business of divining the presence of underground water by walking around the surface with a forked stick. Yet the practice of dowsing has its vehement adherents.

There may be something to it after all. An explanation of how it might work has come from Utah State University where resource scientists, for obvious reasons, believe no method of finding water should be dismissed out of hand.

Assuming that underground water should create small changes in the Earth's magnetic field, they sent off a large group of neophyte diviners armed with dowsing rods made of wire coat hangers. Everytime one of them felt his dowsing rod move, he dropped a block of wood.

According to *New Scientist* magazine, the researchers then measured the magnetic field along the area dowsed and found that "areas with the most rapid change in magnetic field also had the most dowsing responses." So there is evidence, they claim, that dowsing rods at least "enhance or amplify latent response to physical fields."

Nonetheless, the skeptics can still reassure themselves that dowsing remains an unproved science since no wells were drilled where the blocks had fallen.

Two wrongs may make a right

In an article in last month's SMITHSONIAN, "The toxic metals in your future—and in your past," Dale W. Jenkins promised that we would be hearing more about the environmental levels of metallic and other poisonous substances that have so alarmed the public in recent months. Now, among a growing torrent of articles on the subject in scientific journals, comes

An open letter to the readers of Smithsonian

Norman Cousins
Two Dag Hammarskjold Plaza New York, New York 10017

My purpose in writing is to tell you that my colleagues and I have decided to launch a new magazine. The magazine will be published every two weeks. It will be called *World* .

Ever since I resigned from the Saturday Review, for reasons you may know about, I have been thinking and dreaming about the possibility of starting a magazine that, quite literally, would belong to its readers and editors.

This has never been done before. Usually, new magazines call for a prodigious investment. The reason for this is the traditional way a magazine operates. Magazines and newspapers are the only products sold to the consumer at less than the cost of manufacture. Advertising is expected to make up the difference. What compounds this problem is that the standard way of building a subscription list is through cut-rate introductory offers.

On a new magazine, the subscription list generally consists almost entirely of cut-rate introductory offers. This is why massive outside investment has usually been necessary to see a magazine through to the point where introductory-offer readers can be graduated to full-rate subscribers. Outside investment frequently means outside control—and this is something we want to avoid if we possibly can.

My hope, therefore, is that we can find enough readers willing to take a chance on us by becoming long-term subscribers from the very outset. This would make it unnecessary to seek outside financing. It would also put the reader where he should rightfully be—in a position of ultimate authority.

We decided to put these hopes to the test. I am delighted to say that the first responses to our testing have been favorable beyond even our most extravagant expectations. As a result, we are scheduling our first issue for late in the spring.

What about the magazine itself?

We believe that a magazine is essentially a reading, rather than a viewing, experience. In this sense, we will publish for a readership rather than a flippership.

The new magazine will be concerned with ideas and the arts. Our arena, however, will be the world. We will do more than report on books, plays, movies, music and the arts in just the United States alone. We will attempt to review and report on cultural events on a world scale—cultural being defined in its broadest sense.

We will write about the human condition at a time when the ability of human intelligence to meet its problems is being tested as never before. Our hope is to see the world as the astronauts saw it—a beautiful wet blue ball with millions of factors in the delicate combination that makes life possible. Our dominant editorial concern, then, will be the proper care of the human habitat—whether that means world peace and everything that is required to bring it about, or world environmental deterioration, or overcrowding, or any of the things that indignify and humiliate human beings.

We will also give major attention to what we believe will be one of the most compelling issues in the years ahead—the waste of human resources, far more costly than the waste of physical resources.

I think I have said enough to indicate that the new magazine will direct its central editorial energies both to the enjoyment of creative living and to the pursuit of vital ideas. But it would be a mistake, I think, to attempt a full description of the magazine. Magazines are not really invented or created. They evolve. They are the product of creative interaction between the special tastes and enthusiasms and concerns of a few editors, and the tastes and concerns of the readers.

In this way, a magazine takes shape issue by issue and year by year. No single issue can really be expected to tell a reader everything he may want to know about the nature of a magazine, its underlying philosophy, or its capacity for growth. Since it might be misleading to try to tell you exactly what our new magazine will be like, what I have tried to do is to tell you something about our philosophy and our approach—and to seek your help in achieving our aims.

Some specifics: The rates will be $12 for one year; $20 for two years.

For pre-publication Charter subscribers we propose a special three-year rate of $25.

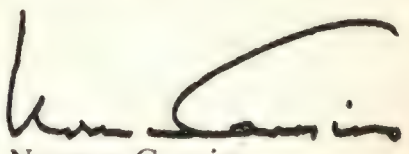
The reason we emphasize three-year subscriptions is that this reduces sharply the astoundingly high cost of processing renewals.

Even more important is the fact that long-term subscriptions will free us to do our main job—which is to try to publish a magazine you will read and respect.

We ask no money now. That can come later. What we do need right now is an expression of your interest.

As I said above, in inviting you to join us in what we hope will be an exciting adventure in ideas, we realize we are asking you to take a chance on us. We have high hopes of justifying that confidence. The process begins with the Charter Subscription form below.

Sincerely,



Norman Cousins

WORLD 01024000
Two Dag Hammarskjold Plaza
New York, N.Y. 10017

Please enter my subscription and bill me later at the charter rate.

☐ $25 for three years ☐ $20 for two years

☐ $12 for a one year subscription

Name_____

Address_____

City_____ State_____ Zip_____

the news that in at least one instance two poisons may be better for you than one.

A team of biologists at the University of Wisconsin has been looking into the question of just how toxic the mercury is that tuna have always accumulated from the oceans. They fed Japanese quail on diets heavily laced with methylmercury: One diet was primarily corn-soya feed, another diet contained a large proportion of tuna. Somewhat to their surprise, they found that the tuna-fed quail survived longer.

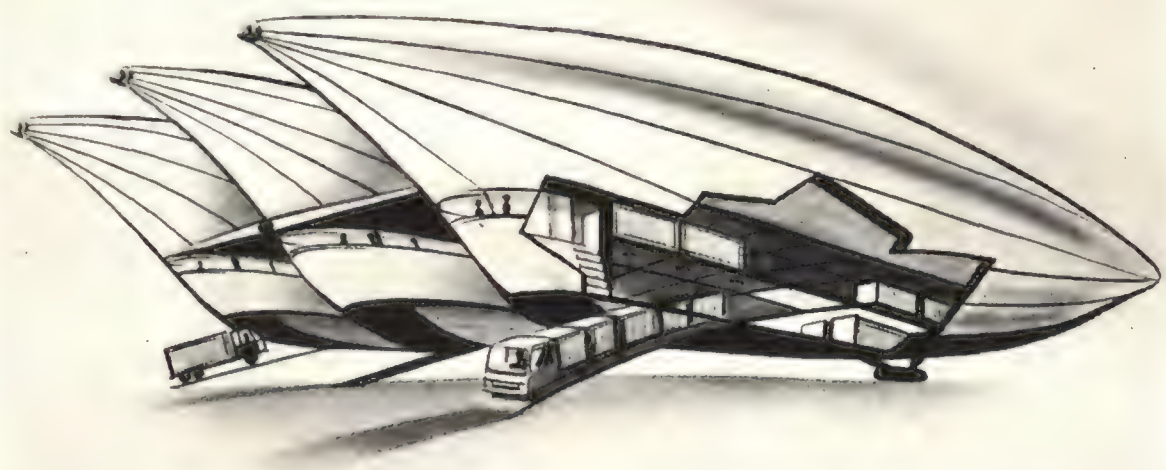
Selenium, it turns out, is present in the oceans in about the same amounts as mercury, and tuna concentrate both substances into their tissues. The more mercury one finds in a tuna the more selenium one is apt to find. Reporting in *Science* magazine, the Wisconsin researchers infer that the two metals are inclined to combine with each other, thus serving "to decrease the availability of each element." Certainly selenium reduces the toxicity of mercury, not only in fish but also in the human bloodstream. Thus, they suggest, selenium in tuna, "far from being a hazard in itself, may lessen the danger to man of mercury in tuna."

The return of the blimp?

A French shipping industry newspaper, *Transat Actualités,* reports that the Goodyear blimp may have some company before long. The Holland-America Line is reportedly looking into dirigibles, as is the ministry of civil aviation in the USSR. A British group called Airfloat Transport has plans to build a dirigible more than 400 yards long and designed to carry 450 tons of cargo at speeds up to 185 kilometers per hour.

Not long ago a team at Boston University designed a new luxury liner which would waft passengers over the Atlantic at an estimated cost of six cents a mile. Of course, the major obstacle in any such

Lighter-than-air trimaran is a new design for dirigible freighters.



If New Mexico is one of the few uncrowded states why aren't we keeping it quiet?

It's a fact that New Mexico is fifth in size, 37th in population and claims a meager concentration of only eight persons per square mile. With all the congestion that is evident in so many other places, you'd think New Mexico would want to close its borders to visitors. No so. New Mexico is big and bold. There's room in its wilderness areas to accommodate just about everyone who has the courage to hike and explore the high country. That's why we're not hesitant about extending invitations to people like you. Drop a card to the Tourist Division, Dept. 7SM, 113 Washington Avenue, Santa Fe, New Mexico 87501 and we'll send you our full color brochure which suggests all kinds of planned vacations for your enjoyment in uncrowded **New Mexico.**

scheme is the memory of the *Hindenburg*. That disaster persists in the public mind in spite of protestations that new materials such as nylon and mylar and the use of inert helium instead of the highly inflammable hydrogen render such accidents virtually impossible.

But if would-be travelers with memories of flames keep the passenger dirigibles from getting off the ground, the cargo business seems to hold out more promise. Lighter-than-air cargo blimps have been designed in the form of giant trimarans driven by gas-turbine engines or by nuclear propulsion systems. Its three "hulls" offer more lift and the same cargo capacity as a conventional single-hulled dirigible twice as long.

Other advantages claimed by blimp promoters are vertical takeoff and landing, speeds three times that of the fastest seagoing freighters now in operation, cargo space far greater than that of airplanes, economies in fuel and negligible pollution, and relative silence.

Quid pro quo

Generation gaps, which still worry some of us, are among the most common arrangements in nature. In practically all animals except mammals and most birds, the gap is virtually complete. Once the young are born, most parents go their way without a backward look. As for feeding the young, the reserves stored in the egg are often all that is provided; thereafter the next generation is utterly on its own.

Variations of this pattern do exist, none more interesting than those found among insects. Perhaps the most interesting—and certainly the most satisfying for parents disgruntled by endless handouts to their children—has come to light in Death Valley through the research of three members of the Laboratory of Desert Biology of Reno's University of Nevada.

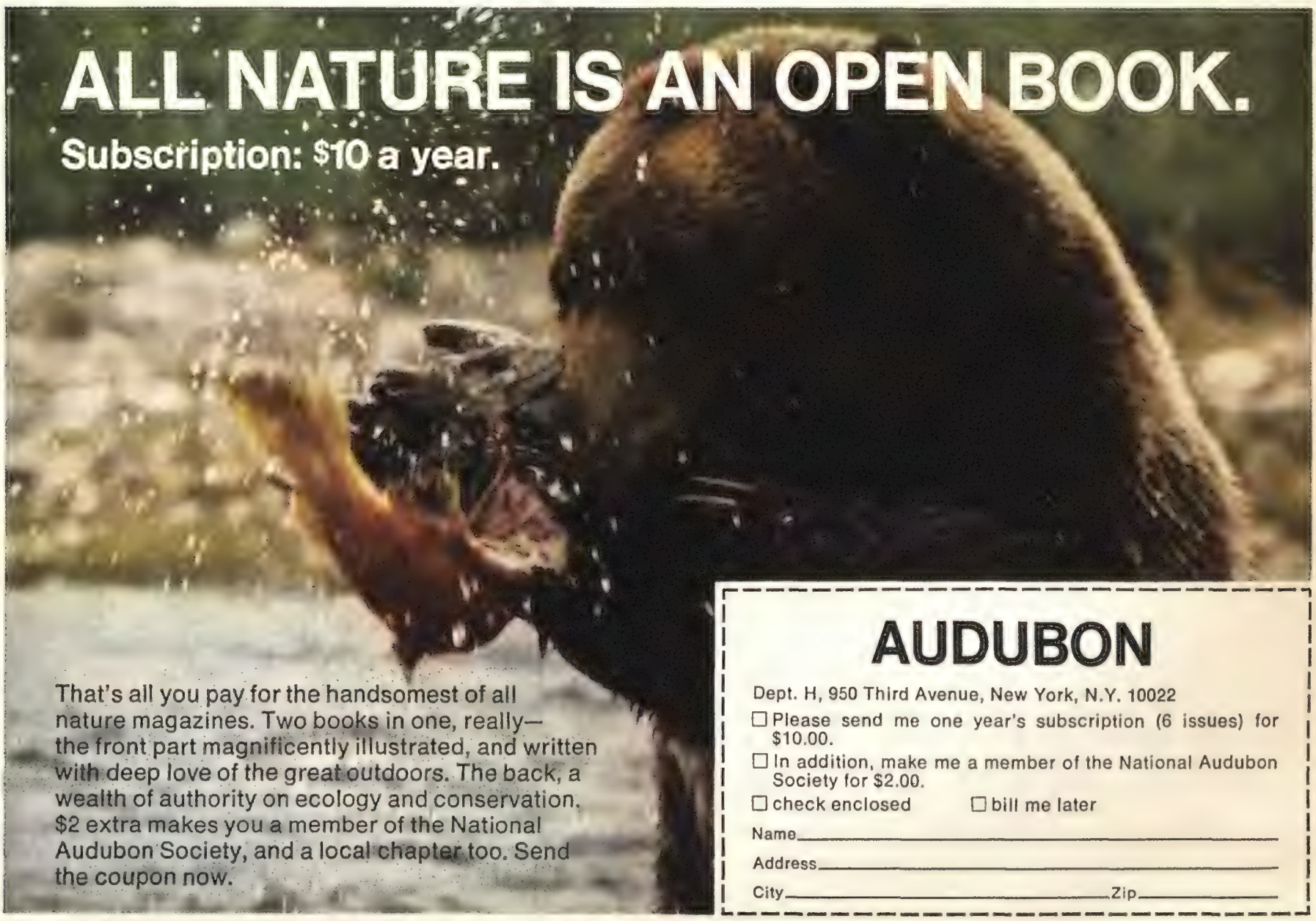
In the course of observing a nest of harvester ants, the question arose as to what the ants eat. On most days columns of foragers would leave the nest, returning shortly with seeds from desert plants, twigs, leaves and other material. Yet the adult ant of this species simply doesn't have a big enough esophagus, nor the abdominal equipment, to eat anything but the tiniest solid particles of food.

Exploring the inside of the nest, they found other adult ants carefully selecting the seeds from the foragers' rather overenthusiastic harvest, chewing up the "meat" and feeding it to the ant larvae in the nest.

Like the larvae of many insects, the harvester ant larvae consist mostly of a big mouth and a stomach. In many instances, such as with the caterpillar, the larval stage digests and stores up food, carrying it through its transformation stages to "feed" itself for its brief adult life. But the adult harvester ants are too long-lived for that to be a solution.

Instead, these social insects have carried the digestive function of the larvae one step further.

The adults collect the food and prepare it for the larvae; the larvae digest it, and then they feed the adults by regurgitating some of their food stores. The researchers wrote in *BioScience* that when "these ants are moving their larvae, they are just carrying their stomachs around." Another way of looking at it is that here is one of the few cases where some children are taking care of their parents in the manner to which they, the parents, have grown accustomed.


ALL NATURE IS AN OPEN BOOK.
Subscription: $10 a year.
That's all you pay for the handsomest of all nature magazines. Two books in one, really—the front part magnificently illustrated, and written with deep love of the great outdoors. The back, a wealth of authority on ecology and conservation. $2 extra makes you a member of the National Audubon Society, and a local chapter too. Send the coupon now.
AUDUBON
Dept. H, 950 Third Avenue, New York, N.Y. 10022
☐ Please send me one year's subscription (6 issues) for $10.00.
☐ In addition, make me a member of the National Audubon Society for $2.00.
☐ check enclosed ☐ bill me later
Name
Address
City Zip

Which one is

The only way to know for sure is to be there in person.

Because both these pictures were taken at Cincinnati's new Riverfront Stadium, where the field is lit by 1648 thousand-watt Metalarc lamps from our GTE Sylvania company.

And the light is so even and natural that color TV cameras can operate at night as though they were under a sunny sky.

It's so uniform there are almost no shadows or hot spots on the field.

At this point, you could say, "Well, that's fine for the Cincinnati Reds, but what does Metalarc lighting do for me?"

Well, consider what it did for the people of Wichita, Kansas, and the kids of Hammonton, New Jersey.

When Metalarc lamps replaced the old lamps in downtown Wichita, they not only lowered the accident rate, but saved the local taxpayers some money.

(Most Sylvania Metalarc lighting costs about a fifth as

Both pictures photographed in Spring 1971 on daylight Ektachrome 35mm film with 500mm f8 lens. Shutter speed 1/125 of a second. GTE, 730 Third Ave., New York, N.Y. 10017

the night game?

much to operate as equivalent incandescent illumination. And Metalarc lamps last about 7½ times as long.)

The people of Hammonton, New Jersey chose Metalarc lamps to replace the incandescents in their kids' Little League stadium. And they don't even televise. They just want everyone involved to have a better look at what's going on.

Now, back to our question. The night game is the one on the right. (Don't take a closer look. It won't help.)

The Metalarc lamp was developed at our lighting research center in Massachusetts. It's just one of literally thousands of types of lighting with the GTE Sylvania name on them.

Here at General Telephone & Electronics, we believe there's no excuse for anybody ever to be left in the dark.

GTE

GENERAL TELEPHONE & ELECTRONICS

By Robert Claiborne

When it is nature's way forest fires are not bad but in fact a benefit

Despite the persuasiveness of Smokey the Bear's message, fire ecologists have found that, to save our forests, we must often burn them

To those who divide the world into Good Guys and Bad Guys, wildfire is unquestionably the vilest species of villain. The word "wildfire" conjures up images of roaring flames, towering smoke clouds and hordes of terrified animals in frenzied stampede or mass barbecue, ending in a desert worthless to Man or beast—and over it all the reproachful message of Smokey the Bear, "Only You Can Prevent Forest Fires."

Yet fires *are* being set, to the tune of tens of thousands every year—and by men who are neither fools nor criminal lunatics.

Guided (and sometimes prodded) by ecologists who for more than a generation have been studying the role of fire in nature, the professional foresters are discovering that a controlled fire this year is often the only way of preventing a catastrophic fire next year, or the year after. Even Smokey's famous slogan turns out to be partly self-deception: While there is no doubt that we can, and should, prevent many fires, there is at present not a hope that we can prevent all of them. Now, as for millions of years past, wildfire is an integral part of the natural order, a force that Man has no prospect of abolishing.

Fire was a regular visitor to most North American forests long before Europeans settled this continent. Some fires were undoubtedly caused by lightning, but many others were set by the Indians. For many tribes, fire was a tool for flushing out game, opening the forest floor for easier travel and hunting, denying cover to human and animal predators and clearing ground for their simple crops.

As Europeans moved into the land, they rapidly adopted the Indians' burning techniques for much the same purposes—as well as to get rid of the Indians. Fire was deemed good for the woods; Jefferson, a lover of the American land, could yet write casually of "fires which traverse whole counties."

As settlement moved into the Midwest, this casual attitude toward fire began to change. Summers there are both hotter and drier than in the East—a combination which not infrequently adds up to what foresters now call "fire weather." The growth of large-scale commercial lumbering enormously aggravated the fire danger: The improvident methods of the time left lopped-off tops and branches, chips and slabs of bark, by the hundreds of tons—"slash" which needed only a droughty summer to become tinder heaps.

In October 1871, after five months with hardly a drop of rain, a fire in Wisconsin, burning over more than a million acres, wiped out the little mill town of Peshtigo—and 1,500 people.

When the lumberjacks carried their wasteful technology into the mountain and Pacific regions, they were tackling, though they did not know it, forests more fire vulnerable in some respects than any in the world. Except for a narrow strip along the Pacific, summers are as hot there as in the Midwest and in many places a good deal drier, with five-month droughts not exceptional but normal.

Even worse, the mountainous terrain sets off numerous summer thunderstorms—often of the "dry" variety which produce plentiful lightning to start fires

New Yorker Robert Claiborne was formerly science editor for Time-Life books and wrote two of them, Drugs *and* Time. *Also he is the author of* Climate, Man and History.

For most people "fire" means devastation such as this from a recent holocaust in the Everglades, but foresters are finding that in many areas controlled burning is the way to tame wildfire.

but little or no rain to stop them. In 1902 smoke from the great Yacolt, Washington, burn forced cities in the Pacific Northwest to light lamps at midday, while eight years later a series of Idaho fires dimmed the sky as far east as Montreal, some 2,000 miles away!

It is not surprising that the then newly established National Forest Service adopted almost from the beginning a rigid, almost religious, anti-fire policy. The task seemed obvious: Don't let fires get started—ever.

There were, to be sure, a few who insisted that it wasn't quite that simple. One of these was the great conservationist John Muir who had long noted the "inviting openness" of the forests covering California's Sierra Nevada. And remarkably enough, these open forests seemed relatively impervious to fire. In 1875, Muir had seen a fire raging through a brush field "in a broad cataract of flames," yet as soon as it moved into a sequoia grove, "the ungovernable flood became calm like a torrent entering a lake, creeping and spreading beneath the trees."

No time for amateurs

The reason, so many early explorers and naturalists believed, was that the Sierra forests had always been periodically burned over by fires, started either by lightning or by the Indians. These regularly consumed much of the underbrush and litter—needles, cones and dead branches—on the forest floor (the place where most fires start), thereby preventing a buildup of this natural tinder. The result was that fires moved slowly, and only on the ground.

As early as 1896, Muir warned that total exclusion of fires, which the professional foresters were already aiming at, was destroying this natural inoculation. The professionals, unfortunately, had little time for the opinions of an amateur like Muir. Total exclusion of fire was fast crystallizing into dogma—and when dogma comes in the door, science flies out the window.

Proposals that fuel accumulation be prevented by periodic burning were denounced in the 1920s in Biblical terms as a theory that must be "cast out and destroyed." The way to stop fire in the Sierras was by "eliminating the causes of fire, rather than by reducing the amount of inflammable material."

As a later and more rational generation of scientists and foresters has recognized, wildfire in fact involves a "triangle" of causes: weather, fuel and ignition. "Fire weather"—a suitable combination of drought, heat and wind (to fan and spread the flames)—occurs annually in California and other places with a dry-summer, "Mediterranean" type of climate, and periodically in most other temperate and tropical regions, simply from the random, year-to-year fluctuations of rainfall. Fuel will exist as long as trees drop their

Crown fire, sweeping through a treetop, needs unnatural amounts of tinder on the forest floor.

leaves and needles to the ground or dried, matted grasses accumulate in open country. And ignition will occur wherever men are careless or malicious—or the turbulent air gives birth to lightning.

Therefore, say today's experts, since weather is beyond Man's control and ignition is at best only partly controllable, fuel would seem to be the most vulnerable point at which wildfire can be attacked. Acceptance of this rational analysis, however, was a long time coming, and the research that would affirm it began a long way from the California Sierras.

When the young zoologist Herbert L. Stoddard came to Tallahassee, Florida, during the mid-1930s, his problem was the bobwhite quail. For more than a generation, wealthy sportsmen had been buying up disused cotton plantations and cut-over timber lands in the Southeast and turning them into hunting preserves. But the quail (and other wildlife), once so plentiful, were now becoming rare, as the once open

lands grew up into bushy thickets of young pine trees.

Stoddard found that the seeds and berries quail favored came mostly from sun-loving plants that are shaded out by pine saplings—and no food, no quail. The solution, he declared, was to burn off the saplings from time to time, thus restoring the sunlight, the forage plants—and the birds themselves.

The forestry bureaucracy was furious at this challenge to their fire dogmas. Fortunately, Stoddard and other advocates of controlled burning soon acquired an even more powerful ally: the southern lumber, pulp and paper industry. Company foresters and consultants such as Stoddard soon discovered that fire played an essential role in reforestation. For one thing, the loblolly, slash and longleaf pines that the companies wanted reproduce very poorly on unburned land; their seeds seldom germinate on a carpet of needles or other plant debris, but require contact with the bare soil. In the case of longleaf, moreover, fire can control an often devastating fungus disease called brown needle spot.

As the trees grow larger, fire can thin out the less vigorous of them and also destroy saplings of other, unwanted species that would otherwise divert part of the available water and nutrients. And to the surprise of nobody familiar with Stoddard's earlier work, forests regularly treated with "prescribed burning," as the technique was coming to be called, supported a much larger population of quail, deer and other game.

Spreading fire over the Southeast

Over the years, the foresters learned to burn in relatively small patches, each one isolated by fire lines—strips in which both trees and combustible litter had been removed. They learned to figure into fire-danger equations such factors as air temperature, humidity, wind velocity and the number of days since the last rain. Prescribed burning was used over tens of thousands of acres in the Southeast.

By the 1960s the practice had become almost respectable—enough so that two federal foresters could study its effect, not simply on tree reproduction and growth, but on wildfire itself. Where prescribed burning had been used within the three previous years, the annual wildfire burn averaged only 0.3 percent of the total acreage; where burning had been done five years previously, the figure jumped to 1.4 percent; and in forests that had never been burned over at all, the annual loss reached 7.0 percent—more than 20 times the figure for the three-years-or-less areas! By 1965 a sizable part of the governmental forestry establishment was convinced; the Forest Service's Southern Region published *A Guide to Fire by Prescription.*

Meanwhile, back at Tallahassee, several groups interested in land and wildlife management had set up the Tall Timbers Research Station to carry out more basic research on the ecological role of fire in nature. Headed first by Stoddard and more recently by Edwin V. Komarek the group has arrived at a general theory that can be summarized about like this: First of all, fire must be considered as part of the natural order of things over much of the Earth's land surface except the tropical rain forest of such regions as the Congo and Amazon basins, which is too wet to burn, and, at the other extreme, desert and semidesert areas in which, despite perennial fire weather, vegetation is too scattered for the flames to spread.

Likewise excluded, though less absolutely, are northerly woodlands like those of Canada, Siberia and the Northeastern United States, as well as the Arctic tundra, where summers are generally moist enough and/or cool enough to suppress the possibility of fire. But everywhere else—in tropical and temperate grasslands

In a low-burning fire with little tinder on the ground, these Idaho trees may well survive.

and savannas, in hot summer climates like those of the American Southeast and the mountain and Pacific states—fires will start sooner or later. How much sooner or later depends chiefly on how frequently the area's pattern of climatic variation turns up the necessary weather conditions: every summer in the California Sierras, every few years in the Carolinas.

But if fire is part of the natural order in certain regions, the ecologists point out, it must play its role, along with other natural forces such as rainfall, temperature, soil and topography, in shaping the vegetation of those regions. And so, indeed, it does—sometimes to the point where the whole character of the area's plant life is determined by fire. A good example is the southeastern pines which, as we have already seen, seldom seed on unburned land.

A southern pine forest may thrive for a hundred years or more—but will not reproduce itself; as the pines succumb to old age or disease, they will—failing fire—be replaced by broadleafed species. The latter have traditionally been considered as the "climax" forest for this region—the type of vegetation that existed there originally and would, in the absence of human intervention, eventually take over again. In fact, however, it appears that much of the region has been pine-covered since the last Ice Age ended, meaning that fire must have been there too; the pine woods are now often spoken of as a "fire climax" forest.

In the fire-climax or "fire-dependent" forest (or grassland), the expectable periodic light fires also perform another important function—what is now called recycling. The continued vigor of any plant community depends in part on the speed with which mineral nutrients that have been incorporated into litter are returned to the soil to spur further plant growth. Much of this job is done by bacteria—provided the litter is sufficiently warm and moist for them to thrive.

In hot-summer areas, however, moisture is likely to be in short supply during the warmest months, while low temperatures slow bacterial metabolism in moister seasons. Not surprisingly, therefore, a light fire in such regions, which converts the litter into mineral ash, is followed by a spurt of growth affecting both trees and other plants. The new growth, moreover, is extra-nutritious to animals; for example, cattle grazed in burned-over forest or pasture gain weight more rapidly than on unburned land.

Forest Service ranger starts a controlled burn. Smokey the Bear might rage but the fire won't.

The myth of frenzied wildlife

As with plants, so with the animals that have evolved in company with fire. Komarek says the popular view that fires are devastating to wildlife is nonsense. Catastrophic crown fires like Peshtigo, he concedes, can destroy wildlife just as they can destroy people—but these disasters are largely the product of man's wasteful logging practices and systematic exclusion of fire. The lighter, more "natural" type of fire, he says, does not merely benefit birds and mammals in the long run, by stimulating the growth of forage plants, but almost never harms them in the short run. He has studied dozens of firesites, both natural and man-made—and has turned up only a handful of animals that had been killed or even injured.

If terrified deer, bear and other animals have on occasion been seen around the edges of fires, the reason, he says, is much less the fire than the activity and noise of human fire-fighters. Nonetheless, the practice of fire ecology has been slow to catch on in some other areas—notably the American West. Investigators such as Harold Biswell of the University of California at Berkeley have paralleled the activities of Komarek and have reached similar conclusions.

Controlled burning in this Oregon forest has permitted new low vegetation to flourish.

Sequoias will not reproduce at all unless fire or something else permits the seeds to make direct contact with the soil. In one controlled experiment, a burned plot produced some 40,000 sequoia seedlings per acre —while an adjacent, unburned area yielded not one! Experience shows that in these forests, as in the East, prescribed burning greatly minimizes a fire's impact.

A dramatic demonstration of this occurred in Arizona, where a 1963 fire driven by a gale swept over a ponderosa pine forest on two sides of a road. On the left, where the forest had been burned over twice during the previous seven years, the fire stayed on the ground—and nine out of ten mature trees survived. On the right, where no burning had taken place, the fire "crowned"—and the forest was virtually wiped out.

Despite such clear evidence, state and federal foresters have shown great reluctance to employ fire as one of their tools. Part of this reason is money. In "government" forests, maintenance is paid out of legislative appropriations—which often barely cover the cost of fire-fighting and conventional fire-prevention.

More difficult to understand is the government foresters' frequent resistance to controlled burning by private individuals. An example of this has been going on for nearly 20 years in a tract of chaparral brushland in the northern California coast ranges. For years the tract near the small town of Scotts Valley supported a large, healthy herd of deer. Hunters and farmers in the neighborhood had long burned off the chaparral regularly, because it kept the country open and was deemed good for the deer.

Around 1940, however, the State Division of Forestry adopted new and rigid regulations against such burning. Within a few years, it became apparent that large numbers of the deer were starving. Moreover, the remaining animals increasingly migrated down from the hills to farmers' croplands in the valley.

The local sportsmen and farmers consulted researchers at the University of California. They found, first, that chaparral leaves are a major item of the deer's diet. Second, they confirmed that when unburned long enough, chaparral grows so high that most tender new shoots are out of the animals' reach.

In 1955, the local residents voted to build a deer fence along the valley edge and burn off portions of the hills. After only two years of burning, covering well over a thousand acres all told, few deer came down to the valley and they increased back in the hills.

The animals, they found, were in better condition, too.

In addition, the burning—which continued up to 1963—produced some fringe benefits. In 1959, a large wildfire swept into the area, burning out 12,000 acres of brushland. It could not be controlled *until it reached the previously burned areas,* when it was easily suppressed for lack of fuel. A second fringe benefit was an increase in stream flow during the dry season.

By 1967, however, when it came time to burn again, the country land had been taken over by the Bureau of Land Management, which issued burning permits reluctantly and only under very restrictive conditions.

Specifically, the new growth of chaparral on the burned areas had to be sprayed with a chemical brush killer and the area reseeded with grass. The local people pointed out that killing off the chaparral would also kill off the deer; they objected even more strongly to the government's demand that they pay half the cost of the spraying and reseeding—which they didn't want in the first place. And there, for the moment, the matter rests; burning has stopped on the public land, which is now once more a mass of dense brush providing little deer fodder.

However, there are signs that the bureau is coming around to a less hard-nosed view. Before too long, it appears, prescribed burning in the West will acquire the respectability it has enjoyed in the Southeast.

All this is not to say, however, that we should quit trying to prevent forest fires—still less that ordinary citizens should go around setting them. Komarek, Biswell and all the other partisans of prescribed burning emphasize that fire is a powerful tool—and, like all such tools, dangerous in unskilled hands. Moreover, they note, it is not applicable to the problems of any and all types of land—specifically, for instance, the broadleaf woodland of the American Northeast, where there is no such thing as a "good" fire.

Even in regions with fire-dependent vegetation, the experts are far from suggesting that natural fires simply be allowed to burn unchecked. This might be feasible if we still possessed the almost limitless forests which the European settlers found here, but we don't, and natural fires, like most natural forces, operate very wastefully—too wastefully to be tolerated nowadays. The issue is not one of "letting nature take its course," say the experts, but of utilizing natural processes *under human control*—of working with nature rather than against it. Komarek, like many ecologists, is fond of quoting the well-known dictum of Francis Bacon: "Nature, to be commanded, must be obeyed."

Wildfire in Washington: a result of carelessness or, as some ecologists say, outworn dogma?

Photographs by Terence Spencer, George Holton and George Watson

Five of the rare birds of the world on remote isles

These living specimens can be found (at least for now) by island-hopping on the Indian Ocean's Seychelles group

"Now I can tell why that booby has a blue nose," growled a man huddled up shivering in a cold rain in an open rubber boat. "I feel like one now myself and if anyone shushes me and points to another bird I'll bash him on the head with an oar."

He was caught in a tropical storm in the lagoon of a rugged and remote island in the Indian Ocean—Aldabra. It was near the end of a rigorous naturalists' cruise to the Seychelles Islands. Aldabra was one of the last stops of this expedition as it angled southwestward down a series of other small island groups that lie between the Seychelles and the ancient landmass of Madagascar, now called the Malagasy Republic.

In every other direction except for the island-sprinkled pathway to Madagascar, the Seychelles look out on 1,000 miles or more of open ocean. Until recently they were among the least-known island paradises of the tropical oceans. In a valley on one of the Seychelles, General Charles "Chinese" Gordon was able to convince himself he had found the true, original Garden of Eden.

The remnants of a once much larger and now drowned landmass, the Seychelles are the only oceanic islands in the world composed of granite. In fact, the Seychelles are a place of one superlative after another —an advertising copywriter's dream. They are the only home of an enormous and bizarre palm tree, the coco-de-mer; they provide nesting sites for stupefyingly large colonies of seabirds; and they are the place where you can see, if you are lucky, at least five of the rarest birds on the face of the Earth (shown on the following three pages).

Just a few days earlier on La Digue Island, the cruise's last stop in the Seychelles Islands proper, they had seen one of these—the black paradise flycatcher (see opposite page).

La Digue is bound by spacious beaches. Granite boulders jut from the crystal waters and fishermen's pirogues lie on their sides in the shade of casuarina trees. Inland, bullock carts lumber along the island's palm-lined lanes, and an extensive area of forest has been retained as a source of timber. It is in this forest and in the nearby human settlement that the world's only population of black paradise flycatchers is to be found. In 1965, a maximum of 28 of the birds was counted. Today there may be as many as 40.

A guide took the travelers to see two of the birds which he had spotted nesting at the edge of a shady grove nearby. Relatively tame, they often nest in low trees along frequented paths or near houses where their insect food is abundant. As a result, the birds are often disturbed and may build several nests before they lay their clutch of one or two, sometimes three, eggs.

They watched a shiny blue-black male on the edge of the nest, his two tail feathers, about 12 inches long, draped gracefully over the side. As the party approached, his mate took over the nest and he went on guard duty with calls of alarm.

They had seen nothing intrinsically dramatic. They had not, for example, seen the male flycatcher fighting another in defense of his large breeding territory, the two males falling together, their long tails flashing through the trees in a great spiral. Instead, they had witnessed birds in an ordinary domestic moment such as you might see in any woods. Nothing dramatic but for the poignant thought that the nesting birds were totally unaware that they were among the last few of their species in the world.

Nor is their future assured. Some of the forest habitat may yet be preserved by new legislation, but demand for the timber is growing on the main island of Mahé. And on La Digue there has also been blasting to widen a road to obtain building stone.

Chance arrivals with uncertain futures

Not that the flycatcher has ever been particularly numerous. Ornithologists believe that the Seychelles—especially when they comprised more land above the sea—served as a corridor by which birds spread from the Indian subcontinent to Madagascar and vice versa. In several instances, small populations reached the Seychelles and went no farther. There, they adapted to particular mini-environments and evolved into forms unique to the islands. The paradise flycatcher,

One of the 20 remaining male black paradise flycatchers takes his turn on the nest on a low leafy branch in a La Digue Island forest.

for example, appears to have evolved from Madagascan ancestors.

In earlier times many of these endemic species inhabited more than one island, but as conditions changed—mostly as a result of vegetation changes in recent centuries caused by human inhabitation and exploitation—several of the species were restricted to even smaller areas on individual islands.

Such is the case with the magpie robin (below, left). Once it inhabited several islands including La Digue and perhaps even the main island of Mahé. Now it is restricted only to tiny Frigate Island. In 1960, there were no more than 20 of the birds alive; in 1965 a maximum of 12. Two years later an ornithologist spotted only nine, but in 1970 at least 30 birds were sighted on the island. The tiny population is not only main-

There are only about 30 Seychelles magpie robins. Relatively tame and plagued by feral cats, they are restricted to a tiny isle called Frigate.

Once thought to be the world's rarest bird, the brush warbler is now coming back on Cousin Island. A few have recently been sighted on nearby Cousine.

taining itself but may be increasing enough to be reintroduced on other islands.

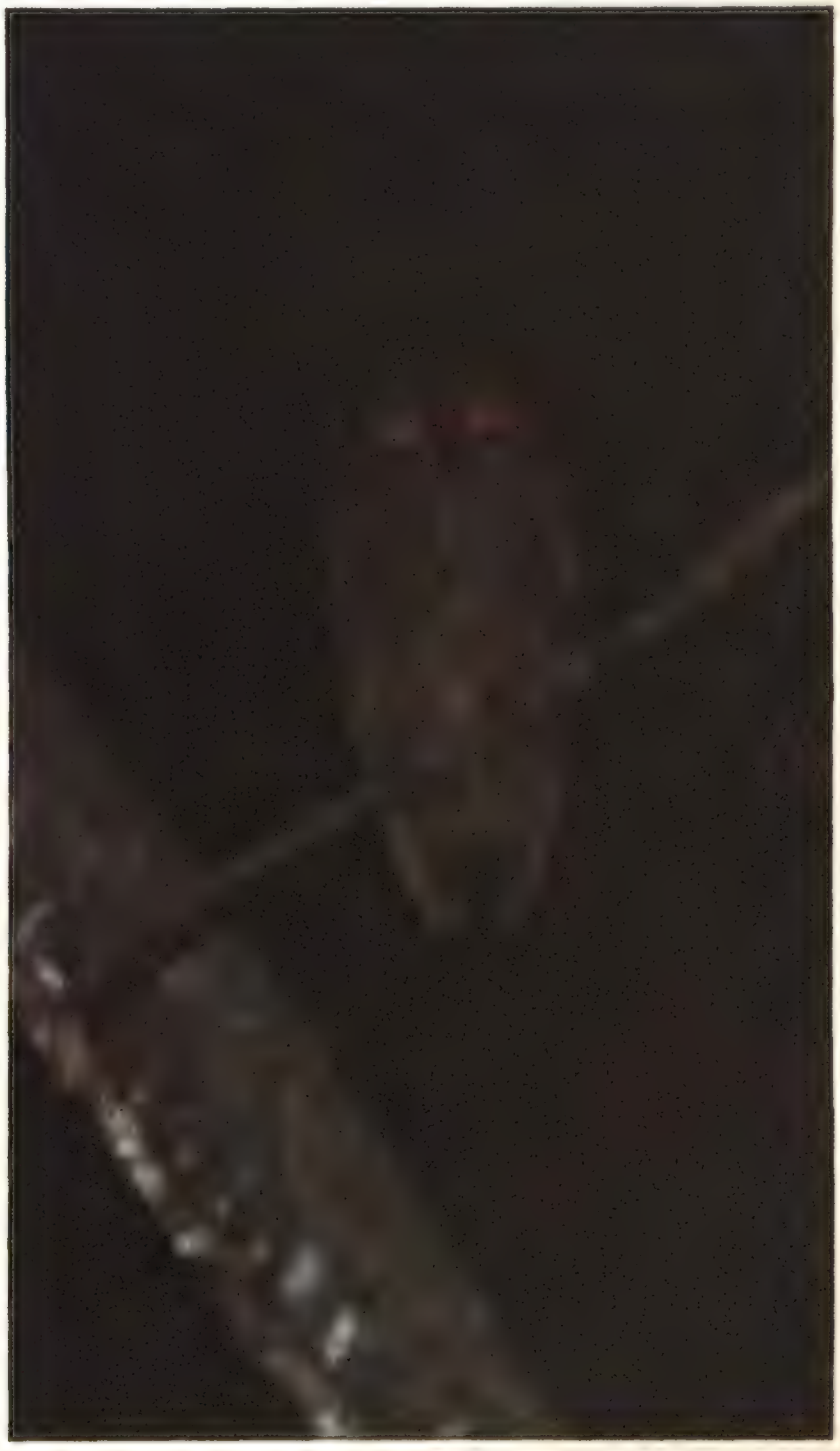
The travelers reached Frigate in a wave-tossed rubber raft and in a few hours saw most of the magpie robins in the world. They are very tame, ground-feeding birds, black with a blue and sometimes greenish sheen and a noticeable broad wing bar of white. Their tameness, so often encountered in island species, is helpful to birdwatchers but not, perhaps, to the robins themselves. They continue to be plagued by feral cats in spite of the fact that the island's owner allows the Seychelles Department of Agriculture to shoot them.

Before bobbing ashore at Frigate Island, they had spent two days on Mahé, where outcroppings of gray rock, smooth as satin from the eroding rains, jut out in peaks from a lush green base.

One night the more ardent birdwatchers among them set off in hopes of spotting the Seychelles bare-legged scops owl. It had been thought extinct for 75 years when, in 1960, a Seychellois ornithologist found it alive in Mahé's high mountainous forest. Just a month before this expedition last spring, George Watson, chairman of the Department of Vertebrate Zoology at the Smithsonian Institution, had managed the first and only photograph ever taken of this nocturnal bird (see below, right) while conducting a Smithsonian Associates' tour of the islands.

After they had groped and scrambled high up the mountainside, Tony Beamish, the naturalist in charge of the expedition, said in hushed tones: "The scops owl was spotted along this branch." His flashlight beam hit a tree limb and he made a sawing noise to

On Praslin Island is a valley "Chinese" Gordon thought was the original Eden, inhabited by the last 50 Seychelles black parrots (above).



The first and so far only photograph ever taken of the Seychelles bare-legged scops owl, a nocturnal recluse on the main island of Mahé.

demonstrate the owl's call (the owl is known locally as the sawyer).

Moonlight dimly outlined the group as they moved silently into the thick forest. Twice they heard the sawing calls and all stopped, as if playing a game of "statue." That night the owl had a highly receptive audience, but it never showed itself.

Unsurprisingly for a bird so elusive that it was "extinct" for three-quarters of a century, little at all is known about the scops owl. It is quite unusual among owls for its unfeathered legs and feet; it probably evolved from a Madagascan ancestor, and apparently feeds on insects and lizards. Not seeing it was a disappointment, though one shared by most people who seek it out. There are probably no more than 20 left, all of them on Mahé (though locals on Praslin Island claim to have heard its sawing call in the night). Biologists guess that it is only the relative inaccessibility of its high forest domain—once much more extensive in lower altitudes—and its secretive ways that have permitted the scops owl to carry on.

Dr. Watson's group also sighted the very rare Seychelles kestrel—a diminutive falcon that resembles the American sparrow hawk and feeds on lizards and insects. This group saw only three captive birds in the Botanic Garden in Victoria, Mahé. Thirty birds were estimated to exist on the island in the mid-1960s, and they may be competing with introduced barn owls for food and nesting sites.

Praslin Island is the home not only of owl rumors but also of another of the Seychelles' rarest birds, the black parrot (see page 27). It is also the site of the Vallée de Mai, "Chinese" Gordon's Eden. This 50-acre valley is the sole spot on Earth where the magnificent coco-de-mer palm grows, living up to 800 years, reaching as high as 100 feet with 40-foot fronds and bearing 60-pound fruit. The huge coconut has an erotic appear-

Red-footed boobies (with blue noses) form a pattern on the mangrove trees of Aldabra, a coral stopover on the way home from the Seychelles Islands.

ance and an ancient reputation as a powerful aphrodisiac. With a romantic's logic, Gordon assumed it to be the Fruit of Knowledge. As if this were not enough, the valley also contains the Seychelles' only large serpent, a green boa which Gordon somehow seems to have overlooked.

The black parrot is more visible—a dull black bird, usually seen in the tops of the trees or flying above the forest in the Vallée de Mai. Although there are but 50 extant, one often hears their long clear whistles among the cathedral-like palms. And their future seems as well assured as any rare bird's can be, since the entire valley, with its legendary palms, is now protected as a nature preserve.

Once again, little is known about this parrot: It seems to nest in rotting trees and happily feeds on the flowers and fruits of a number of introduced as well as endemic trees. An almost indistinguishable close relative, or subspecies, is found in the Comoros Islands far to the south; another ancestral subspecies of the parrot inhabits Madagascar.

About two miles offshore from Praslin is a tiny island of some 70 acres called Cousin. The entire island was bought by the International Council for Bird Protection and set aside as a bird preserve in 1968. At the time of this visit it was the home of a few humans, including the Reserve's warden.

The Indian Ocean's first refuge

The Cousin Island Reserve, the first such in the entire Indian Ocean, publishes a brochure that informs you that there are no cats and rats on the island, or other mammalian predators. Any predatory barn owl caught wandering over from Praslin is shot on sight. (The barn owl, like the myna and a host of other birds, was artificially introduced into the islands. It was hoped that it would control introduced rats, but it found the native birds and lizards fair game.) Thanks to these precautions, you find dense populations of a variety of seabirds on Cousin—shearwaters, tropicbirds, bridled terns, noddy terns and fairy terns.

In the pinelike casuarina trees which line the beach, visitors may be greeted by myriads of fairy terns from a colony of 20,000. They fly up close, fluttering like so many ballerinas in white tutus when you wander too near a nest. Eggs are often laid in the most precarious spots—on a bare limb, a post or a ledge—any place, it seemed, that the tern might be when it was egg-laying time (see page 30).

Land birds also thrive here, including the only pure Seychelles stock of the Madagascar turtle dove as well as the Seychelles fody. But the rarest of Cousin's birds is the Seychelles brush warbler (see page 26). This dull, olive-colored bird with its throaty song was once

thought to be the rarest bird in the world, but some 30 were counted in 1960, and probably 40 pairs now live on Cousin. They may also breed on nearby Cousine. Like the others, the brush warbler is believed to have Madagascan origins. Several were spotted on trails through the dense growth.

The Cousin Island refuge is the most ambitious conservation project to date in the Seychelles. Other efforts are under way, as are biological studies that began in earnest with the Bristol University Seychelles Expedition in 1964-65 for the World Wildlife Fund.

Indeed, with their fragile populations of little known and rare birds, the Seychelles are an ornithologist's and conservationist's dream—and nightmare. Whatever precautions may be taken, populations so small and so restricted as these can easily and quickly be eliminated by something beyond human control, such as a storm or the chance introduction of some new parasite or disease.

In spite of the very restricted ranges of some of the native Seychelles birds, only two species are known to have disappeared entirely since the islands have been inhabited: a large green parrot that was last seen alive by Dr. W. L. Abbott, who visited the islands in the 1890s for the Smithsonian, and a warblerlike yellow white-eye, which Dr. Abbott also sighted. The parrot was a tempting and conspicuous target on the main island of Mahé, while the white-eye may have had very specialized requirements and had a range restricted to a few outlying islands.

It is not only the tiny populations of rare species that are under the gun. Standing on a sandbar in the midst of a nesting colony of sooty terns, with the sky overhead filled as high as 300 feet with hundreds of thousands of wheeling birds and a babble of voices, it seems like the worst kind of wolf-crying to worry about these seabirds. Yet in the Seychelles egg-cropping is a longstanding practice with a potentially growing market in the increasingly populous islands. And the annual take of eggs had dropped in 1954 to one-quarter of the take in 1931.

Human pressures are bound to grow now that these paradises have been opened up to convenient tourism. Visitors winging in by jet to the new airport, along with a growing resident population, will inevitably put severe strain on the endemic bird populations.

To the southwest lies Aldabra, where the huge concentrations of boobies had momentarily reminded the rain-soaked naturalist of himself. Aldabra is a stronghold for giant tortoises (long extinct in the Seychelles except on Cousin, where a small semicaptive bale still persists) and this island was itself only recently under the gun—literally. In the late 1960s Aldabra was deemed a splendidly strategic site for a British-American airstaging base and communications center. Conservationists (many of whom had never seen the place) protested vehemently. This outcry and a dip in the British economy finally scuttled the project.

There will always be a plenitude of such schemes for these islands. But if the last 20 scops owls, for example, are permitted to disappear because of any such scheme, there will never be another one of them.

Hatched on a naked branch, this young fairy tern may not have lived through the summer: A low percentage of new fairy terns survived during 1970.

Photographers don't disturb a Seychelles nesting colony of not yet so rare sooty terns, some of the one million terns that nest on Bird Island.

Smithsonian acquisition

Photographs by Stan Wayman

Ballooning's joys once more on the rise

In the Paris of the 1780s and '90s, people went wild with enthusiasm for the balloon—the first feasible device that would lift a man into the air. The madness started in November 1783, when the brothers Montgolfier, standing on a circular catwalk beneath their huge, inflated paper-and-cotton sack, rose splendidly above a cheering throng. Hot air lifted them. Ten days later, hydrogen lifted Professor Jacques A.C. Charles in his tub-shaped basket. And as the notion spread that Man could at last leave his Mother Earth, people everywhere were captivated and expressed their feelings in art and design, in literature and music.

Nearly two centuries later, after Man has reached the moon, the old joyous wonderment of balloons is revived at the Smithsonian's Arts and Industries Building. When you stand directly under the full-size Japanese *Fu-go* balloon (seen through a fish-eye lens, left), one of the scores which drifted across the Pacific on the jet stream during World War II in a relatively unsuccessful attempt to start forest fires in the United States, you sense a silent, straining urge to break free of the ceiling and soar to distant heights. Noninflammable helium fills this great paper bag (the war-weary original has an inner lining of mylar to make it gastight), just as it does ten other small balloons that bob above visitors' heads. Of these, some are replicas of historic aerostats such as Professor Charles'. Another bag works on hot air, rising from a hidden gas burner, then dropping back to it when it cools. It's a model of the Montgolfier.

Around the walls are the sketches and cartoons of balloonomania. An alcove is furnished with objects bearing the balloon motif, while overhead are chandeliers in guess what shape. And some of the music of ballooning fills your ears, stirring visions of brave, bearded gentlemen popping champagne corks, of languorous ladies flying high in ornate gondolas.

Visitors fill in the faces in the balloon basket
of Vincenzo Lunardi, colorful balloon pioneer.

Puppet show reenacts first English Channel flight
by Jean-Pierre Blanchard and Dr. John Jeffries.

Replica of the Montgolfier hot-air balloon duplicates
Man's first flight, thanks to a hidden gas jet.

Distinctive new notecards

from the Smithsonian Museum Shops

Athenian Coin 500 B.C.

The Smithsonian Museum Shops offer ten notecard subjects. Measuring 5¾ x 4 inches, these cards are glossy finish, full color. Each subject is a well known item from the Smithsonian's collections with a short identifying curatorial statement. The cards come ten of a single subject to a box. Envelopes included. $1.50.

1 Silver Athenian owl coin on a bright pink background. (pictured)
2 Indian, or Bengal Tiger, shown in a life-like pose. White and orange border.
3 Pioneer Locomotive-1851 printed on a yellow background with a brown border.
4 Oil painting of the side wheeler "America" printed on whole front of card.
5 Weather Vane-"Gabriel" brightly pictured on tangerine background with brown border.
6 "Infinity" sculpture shown on a sunny day at the mall entrance of the National Museum of History and Technology.
7 Lunar Lander pictured in detail on the full front of card.
8 Inverted center air mail stamp with a blue background and red border to complement these same colors in the stamp.
9 African Bush Elephant pictured in all his majesty on entire front of card.
10 Model T Ford shown against orange background surrounded by brown border.

Smithsonian Associates 10% discount applies to all orders. Add $.75 mailing and handling charge per order. Discount applies to purchase price only. Minimum order: 4 boxes. $1.50 per box of ten.

Indicate quantity of each subject desired:

_____ boxes at $1.50 ea. $_____
less Associates discount $_____
plus handling charge $ .75
TOTAL remittance $_____

1 ☐ 6 ☐
2 ☐ 7 ☐
3 ☐ 8 ☐
4 ☐ 9 ☐
5 ☐ 10 ☐

Name _____

Street _____

City State Zip

Smithsonian Museum Shops

Smithsonian Institution, Washington, D.C. 20560

By Frank Getlein

Images of the old West painted while it was still there

Brought together in a big new exhibition, these works become considerably more than mere records of a vanished way of life

The uniqueness of the United States of America is a venerable proposition in this country but one which has been getting its knocks in recent years. Americans have been discovering that we are, after all, much like most of the other great powers of history. Nevertheless, a strong case can still be made for the singularity of the United States. Of all the formative experiences of all the nations of the world, surely the most special is the American experience of the American West.

The West has been a beacon for centuries to those Europeans who were to become Americans. Almost from the first, the fringe of English settlers along the shore felt the pull of the West. The fascination has lasted in literature from James Fenimore Cooper to the paraliterature of the movies and the subliterature of television. The Western experience, too, has produced a large body of painting and sculpture. This is being given what looks to be its most serious examination in a major exhibition—a benefit for the American Association of Museums, which opened March 20 at the Los Angeles County Museum of Art, goes on June 28 to the M. H. De Young Memorial Museum in San Francisco and on November 2 to the Art Museum of St. Louis.

In the geography of its showings, the "American

George Catlin's *Bull Dance* depicts a ceremony amidst the domed dwellings of the Mandan Indians.

National Collection of Fine Arts

Art of the old West

West" exhibition thus covers the two Pacific Coast terminal points of the western migration and, in St. Louis, the most important jumping-off point. In its scope, too, from 1820 to 1900, from Catlin to Remington and Russell, the exhibition presents a full view of an important branch of American art which has been, strangely, more often seriously received in Europe than at home.

That difference in reception is easily explained. It is echoed in the other arts, too, from the near idolization by the French of the American poet they refer to as E.-A. Poe and his dismissal as a drunk in his native land, to the fact that until very recently indeed American operatic singers were much better advised to begin their careers in Europe than at home. From the beginning, Americans interested in the arts took it for granted that art was something that came from somewhere else, chiefly Europe. Those American artists most valued by their countrymen were those who most nearly approximated the presumed artistic standards of the Europeans. With that general disposition, it cannot surprise anyone that Americans have never appreciated, or even accepted, the art of the American West as true art—the Europeans never had a West to make art about, so how could Western art be *art*?

There is also another and equally important reason for our general lack of appreciation for this singularly American branch of American art, and that is the heavily nonartistic bias of most of its partisans. A case at hand is this season's prime book in the field, *The Art of the Old West,* based on the collection of the Gilcrease Institute in Tulsa. Although the text is by two art professionals, Paul A. Rossi and David C. Hunt—the director and the curator of the Institute, respectively—it is only very rarely, and then almost accidentally, concerned with artistic values. Rather, the excellent text is an account of the ways of life along the frontier from the earliest days to the late 19th century. In this view the pictures are important not as works of art but as illustrations of a vanished or vanishing life-style thought to be of supreme importance. Such an attitude, acquiesced in by the two museum men, is simply taken for granted by most collectors of Western art, and it even colored the thinking of some artists in the field.

It is not, to be sure, an attitude unique to admirers of Western art. It seems not unreasonable to assume, for instance, that the Greeks who commissioned statues and temples to the gods really believed the godliness of the enterprise more important than the artistic qualities, and to assume, too, that similar beliefs animated some of the popes and cardinals who were the patrons for so much of the Renaissance achievement.

The current show, sponsored by and benefiting the body of American museums in common cause assembled, should do much, first, to call Western art to the attention of those who determine what is or is not art in this country (Warhol's Brillo boxes, yes; Norman Rockwell's *Thanksgiving,* no, and so on) and, second, to discern some sort of order in the course of Western painting and sculpture, now much too uniformly received by its admirers as undifferentiated *objets de vertu* derived from the sacred way it commemorates.

There's a lot of virtue there, all right, and a lot of it does derive from the way of life the pictures and statues record or recall. Right there—the difference between recording and recalling—may be the most important point for the discerning of order in the growth of Western art.

An important figure in history

The cowboy, as the best-known figure of Western life and Western art, has been so vulgarized by the movies and television and, before them, by the dime novel and the Buffalo Bill type of arena extravaganza, that much of his historical significance is lost. But he was an enormously important figure in American history, the more so when that history is viewed in mythic terms, as all history has to be to enter into the soul of the people who are its product.

In the first place, he stands as a prime example of what we in the United States, with unconscious arrogance and aggrandizement, call "American"—that is, us—while the other European people in the American hemisphere discover, on inquiry, that they are really something else—Spanish-Americans, Latin-Americans, even Canadians. Alone among all the types of wester-

Frank Getlein, theater and film critic for the Washington Star, *is writing a biography of the contemporary American sculptor Milton Hebald.*

Courtesy the Honorable Claiborne Pell, Washington, D.C.

George Caleb Bingham, *The Jolly Flatboatmen,* 1846
—one of his studies of life on the Missouri.

Charles M. Russell, *Buffalo Hunt*. Painted in 1899, this is clearly a recollection of earlier days.

Courtesy Amon Carter Museum, Fort Worth

Museum of Fine Arts, Boston

ing Americans, the cowboy breaks right across that wall between North and South. His livelihood, his life-style, his very existence, are a blend of Spanish American and North American.

He was, in fact, Spanish in origin and had been right here within the current territory of the United States for some two and a half centuries before the Declaration of Independence. When, in the early 19th century, the Anglos from the East arrived on the cattle-raising scene, they inevitably picked up the ways of riding, roping and living that had evolved among the Spanish *vaqueros* of California. They created, or perpetuated, a figure unique in history: the mounted man who is also a worker.

Historically speaking, men on horseback have usually been up there in order to get a better crack at the heads of people on foot and bring them into some degree of subservience. Thus the Saracens, the Crusaders, the flower of European chivalry, the Huns and dozens of other gangs of mounted men. The idea has been that skill in guiding a horse excused a man from working for a living and imposed upon others the obligation to support him and his family and friends in rather grand style. (To this day, such famous equestriennes as Princess Anne and Jacqueline Onassis might be said to benefit from this principle.)

The cowboy scrapped that whole timeless notion. He was not a beggar on horseback but a *worker* on horseback, an idea that had never occurred to anyone before in the history of mankind. So much had it not occurred that the early Spanish ranchers in California were forbidden by law to allow their Indian workers to ride horses. Cattle ranching in the New World style, however, could only be carried on with a lot more riders than there were aristocrats—first Spanish, then, as we say, American. Hence the cowpoke embodies two important themes of U.S. history: first, hands across the border, Good Neighbors, and so on; and second, the rise of the American worker into a kind of aristocracy. The auto worker with his power boat on Lake

Courtesy of Kennedy Galleries, Inc., New York

Opposite: Albert Bierstadt, *Lake Tahoe,* 1867. A typical example of his grandiloquent landscapes.

Above: Thomas Moran, *Mammoth Hot Springs,* 1875. The public first saw Yellowstone through his eyes.

St. Clair was foreshadowed by the cowboy on his horse.

The cowboy is today by far the most popular subject among collectors of the genre. But the American West as a subject goes back well beyond that meeting of Yankee or Confederate with *ranchero* that led to the creation of the cowboy.

George Catlin, whom we now call an anthropologist, set out in wonder to chronicle sights never seen, or not often seen, by people in cities along the East Coast or in Europe. Responding to a sensitivity that stirred within him when he saw in the streets of Philadelphia an Indian delegation on its way to Washington, Catlin shoved off from St. Louis in 1832 for eight years of recording life among the Indians of the Great Plains.

He painted what he saw pretty much as he saw it. There is, in all his works, a tremendous impression of the sheer innocence of American Indian life as it was then (pages 36-37). That unrefined impression taken at the scene was of undoubted value to his contemporaries; it is of inestimable value to us: It brings us to the Indians, and them to us, before they began to be hopelessly and forever changed by their relations with the whites. His simple, direct and unpretentious style of painting was exactly right for that last possible on-the-spot vision of the way things might have been.

Catlin came from the East Coast into the river systems and prairies of Indian country. He brought with him a certain awe, a certain distance, a certain recognition of the exoticism of his subjects. This is also true of the European painters who, somewhat later, were attracted to the American West in great numbers. Of them all, Albert Bierstadt was the most successful in every sense. Born near Düsseldorf, he grew up in New Bedford, Massachusetts, but returned to his native land for art training in the famed "Düsseldorf school," a peak of romantic realism for which the Rocky Mountains were made. The Far West to which Bierstadt came in his late twenties (with an 1859 U.S. Army expedition) has been largely seen through his eyes ever since (opposite). The looming peaks under the infinite skies, the falls of water and the vast stretches of prairie, were all superbly organized into measured and comprehensible immensities by this painter.

In contrast, Virginia-born George Caleb Bingham grew up in Missouri in the 1820s and painted settlers and riverboatmen for the same reason Reynolds

painted aristocrats and Raphael painted popes: They were there.

Bingham's life on the Missouri was very different from Mark Twain's life on the Mississippi. The Missouri is a somewhat smaller river, for one thing; but beyond that Bingham was on the water a generation earlier. His fur traders in their dugout, his flatboatmen (page 39), reach back to the earlier navigation of the Western waterways by solitary explorers and traders. Mark Twain's throbbing, shiny engines on the Mississippi were opening a new era, not only the Cotton Kingdom of the deep South but the whole mechanization of the West. Mark Twain looked to the future—even when, as in Huck Finn's lighting out for the Territory, it repelled him. Bingham recorded a serene present that was one with its past, a quiet, eternal drift along those undisturbed waters.

Bingham also portrayed another aspect of the emerging West: its new, somewhat raucous style of politics that the East found out about with the inauguration of Andrew Jackson. Bingham's pictures of the ritual of democracy in the West, with whiskey quite openly being traded for votes, presented a very different vision from that of the New England meeting or that of Jefferson's yeoman-philosopher. The Western vision proved irresistible to him. After a youth spent in producing some of the most haunting images of the West ever painted, Bingham in maturity entered Missouri politics (always a very special variety), rose to high state offices and abandoned his art.

Of the 24 artists represented in the exhibition, two especially stand out as painters par excellence of the West, perhaps because that has come to mean, to most Americans, the world of cattle and the cowboy. Frederic Remington and Charles M. Russell both came to the West as boys. At 16, Charlie Russell lit out from St. Louis for Montana and the life of a cowboy, including the better part of a year spent living with the Blood Indians in Canada. He began drawing and painting chiefly to while away the long winter nights in the bunkhouse. He more or less stumbled into an artistic career when strangers began seeking him out to buy his watercolors and oils and his indomitable wife, Nancy, put the thing on a businesslike basis.

Russell brought to his work a thorough knowledge of cowboys and Indians, and painted them with a love made more poignant by the knowledge that the life he had found in Montana was inevitably on the way out (page 39). He was right. He died in 1926 and just before that, asked to say a few words to a Montana meeting, could only say: "I wish to God that this country was just like it was when I first saw it, and that none of you folks were here at all." At his best, Russell had an astonishing eye for the complex reality of a man and a horse in motion, and a spacious feeling for the big skies and looming mountains.

Remington made his getaway from Yale University, where he was one of two art students. When his father died he headed West. As a cowboy and a trail cook, Remington learned fast; he returned East to paint from his sketches and quickly established a life he found perfect, splitting his years between East and West and finding ready acceptance as an illustrator of books, magazines and newspapers. It was Remington, on assignment in Cuba and complaining of the quiet, who received the famous cable from William Randolph Hearst: "You furnish the pictures and I'll furnish the war." Like Russell, Remington was proud of the accuracy of his pictures. He asked—in vain—that his tombstone bear the words, "He knew the horse."

Something more than nostalgia

Remington knew more than the horse. He knew the relaxed tension of men operating at the top of their trade in moments of peril. He knew the shifting lights of the prairie. And he knew that it was all disappearing before his eyes.

That sense of vanished independence and individuality, which characterized the West as earlier it had characterized the East, that particular aspect of nostalgia, informs "The American West" more than any other note. But the exhibition has an importance beyond nostalgia. By revealing in some detail the high points of an immense body of art about the West, the show adds a substantial and uniquely American virtue to the common image we share of American art.

Frederic Remington, *An Indian Trapper,* 1889.
He made sketches in the West, finished them in the East.

Courtesy Amon Carter Museum, Fort Worth

Rating th

In tests by two of Europe's leading motor magazines, steel-belted

1969: Auto Motor und Sport Magazine

1ST	Uniroyal 180	(Steel)
2ND	Michelin XAS	(Steel)
3RD	Phoenix Sen.	(Fabric)
4TH	Metzeler Monza	(Fabric)
5TH	Fulda P 23	(Fabric)

These tests included: handling on curves, steering exactness on a zig-zag slalom course, braking distance and behavior, acceleration and skid resistance on a wet circular track, comfort and wear. In addition, Auto Motor und

1970: Auto Motor und Sport Magazine

1ST	Uniroyal 180	(Steel)
2ND	Pirelli CN 36	(Steel)
3RD	Michelin zX	(Steel)
4TH	Kleber V 10	(Fabric)
5TH	Semperit	(Fabric)
6TH	Dunlop SP 68	(Fabric)

Sport included a test for tire noise in '69, winter suit-

Although radial tires are big news in the U.S. today, they have been widely used in Europe—and increasingly preferred—for the past fifteen years.

To a European motorist, the question today is not whether to get a radial, but what kind of a radial to get.

To help answer that question, two of Europe's leading motoring magazines—"Auto Motor und Sport" and "Auto Zeitung"—conducted exhaustive track tests of the most famous European radial tires. (Test criteria are described above.)

The results show that steel-belted radials as a group received higher overall ratings than fabric-belted radials, winning both first and second places in 1969, 1970 and 1971. They did not, of course, win in every test category.

The steel-belted radial tires have a built-in advantage which was not included in these tests—substantially greater protection against cuts and punctures—because the belts under the tread are made of steel wire. (Cuts are the major cause of tire failure, by the way.)

Uniroyal steel-belted radials are now available in the United States.

We are pleased to be able to tell you that the Uniroyal 180 steel-belted radial—which won first place

e radials.

radial tires received higher overall ratings than fabric-belted radials.

1971: Auto Motor und Sport Magazine

1ST	Metzeler Monza	(Steel)
2ND	Conti TS 771	(Steel)
3RD	Uniroyal 180	(Steel)
4TH	Phoenix Sen.	(Fabric)
5TH	Fulda P 25 Rib	(Fabric)
6TH	Goodyear G800	(Fabric)

ability in '70 and aquaplaning tendency in '71.

1971: Auto Zeitung Magazine

1ST	Uniroyal 180	(Steel)
2ND	Michelin zX	(Steel)
3RD	Pirelli CF 67	(Fabric)
4TH	Conti TS 771	(Steel)
5TH	Kleber V 10	(Fabric)
6TH	Conti TT 714	(Fabric)
6TH	Fulda P 25 Rib	(Fabric)
8TH	Dunlop Sp 57F	(Fabric)
9TH	Phoenix P110Ti	(Fabric)
10TH	Bridgestone	(Fabric)
10TH	Metzeler Monza	(Steel)
12TH	Metzeler Monza	(Fabric)
13TH	Goodyear G800	(Fabric)

overall in three out of four of the above series of tests —is now available in this country in sizes to fit most of the popular European cars.

In addition, Uniroyal is now making a steel-belted radial especially designed for American cars, called the Uniroyal Zeta 40M. This tire is being produced in the United States.

Other companies are beginning to offer you steel-belted radials. But bear in mind that the steel-belted radial is a more difficult tire to make because steel is a more difficult material to work with.

Uniroyal has made more than 20 million steel-belted radials over the past 12 years, and knows how to make them properly.

In fact, there are only two tire companies in the world that have this much experience in making steel-belted radials—Michelin and Uniroyal.

When you go to buy a steel-belted radial, don't let them sell you just a radial tire or a steel-belted tire. It's not the same thing.

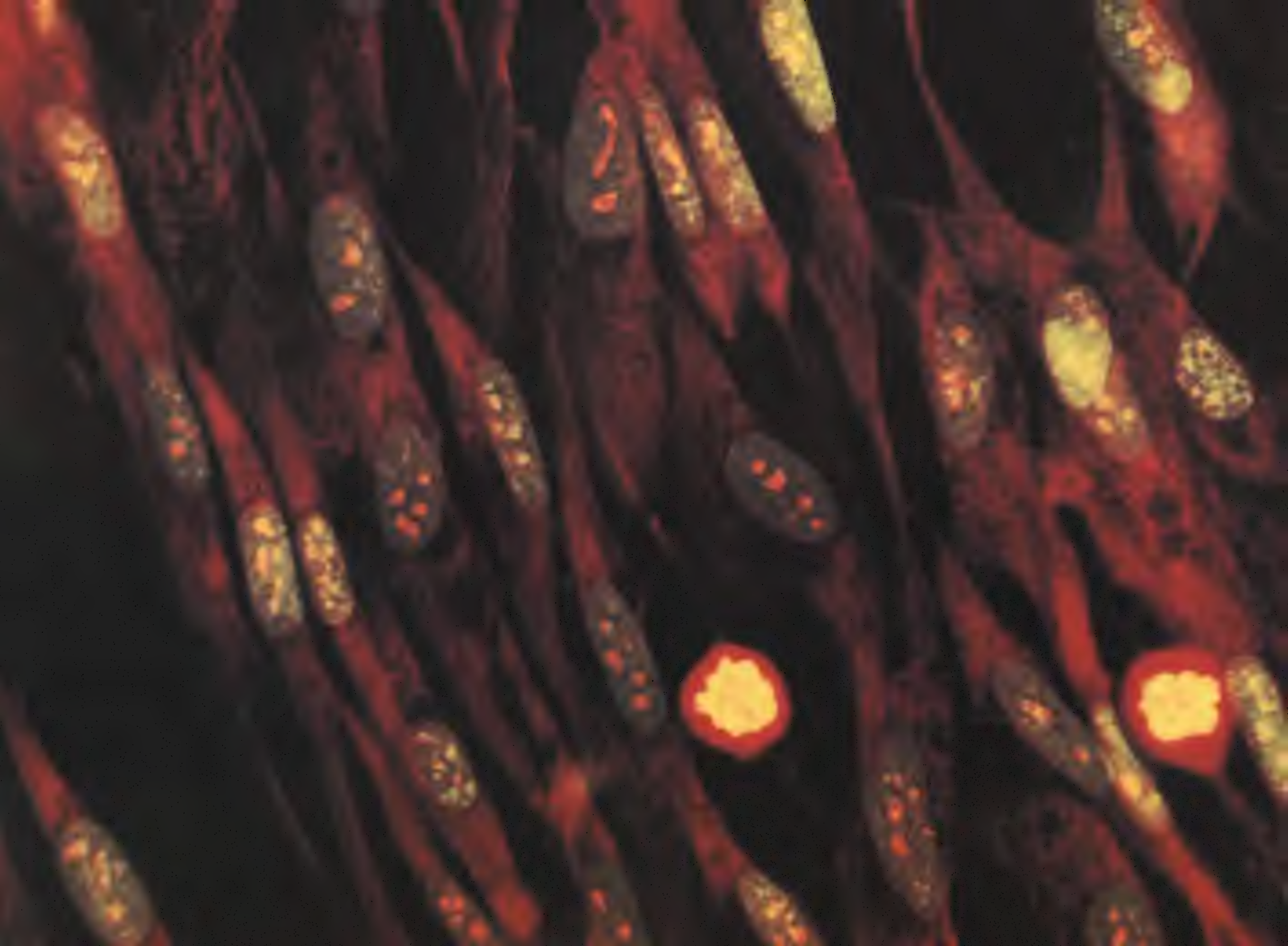
Here is how to tell what you're getting. If the dealer tells you it's a "radial tire", you can be pretty sure it's a fabric-belted radial. If he tells you it's a "steel tire," the chances are it's a steel-belted bias construction. (That is, a conventional tire, without the performance advantages of a radial.) If it's a steel-belted radial, you can bet your boots he's going to let you know it!

Would you like to know the name of a dealer in your locality where you can get Uniroyal steel-belted radials? Telephone (800)-243-6000 anytime, free of charge. In Connecticut, call 1-(800)-882-6500.

Would you like to get a complete and unabridged English translation of the reports of all four of the radial tire tests described above? Send 25c to Dept. GP, Uniroyal, Oxford, Connecticut 06749. When you're finished reading this series of test reports, you'll know what to look for in radial tires.

UNIROYAL

c Uniroyal



By Irene Kiefer

Proving we are the stuff of which stars are made

In meteorites and moon rocks, in tiny fossils and laboratories, evolutionists trace the earliest chemical steps that led to life

In 1966, the Russian founder of modern chemical evolution, A. I. Oparin, met with Dr. Cyril Ponnamperuma (right), a leading U.S. practitioner.

Fireflies, said Aristotle, arise out of the morning dew: Life begins by spontaneous generation. Most Western philosophers agreed until the middle of the 19th century. Then Louis Pasteur, in a series of brilliantly conceived experiments, demonstrated that living organisms cannot arise out of nonliving material. Announcing his results to the French Academy, Pasteur said: "Never will the doctrine of spontaneous generation recover from this mortal blow."

It has. The work of chemists, biologists, physicists, astronomers and geologists is forcing a return to spontaneous generation, albeit at the molecular level. Darwin postulated a "primordial germ" as the root of life, then explained how Man came to be from that germ. Chemical evolutionists seek to explain how that primordial germ came to be, to discover how complex chemical molecules slowly built up until, eventually, spontaneously, life began.

Chemical evolution is based on this premise: The laws of chemistry and physics are universal. To the chemical evolutionist, nature is a unity from the first matter in the universe, a cloud of hydrogen, to Man. The terms "living" and "nonliving," while convenient for distinguishing between a man and a stone, are inadequate for describing a virus, a particle which can be crystallized like a chemical compound, separated into its two component parts (a strand of nucleic acid and a protein shell), then recombined into a particle that can reproduce itself.

This chemical approach to the origin of life has grown out of the work and speculations of many individuals, but perhaps the greatest debt is to Alexander Ivanovich Oparin (above). In 1924, the Russian biochemist, not yet 30 years old, postulated a long chemical evolution as a necessary preamble to the origin of life. He declared that there is "no fundamental difference between a living organism and lifeless matter. The complex manifestations and properties so characteristic of life must have arisen in the process of the evolution of matter."

Four years later, the British biologist J. B. S. Haldane speculated that the action of ultraviolet light on the Earth's atmosphere would have given rise to a variety of molecules until the oceans became a "hot dilute soup" in which life probably began.

And, in 1948, J. D. Bernal of the University of London suggested that the small molecules might have become sufficiently crowded in lagoons and pools along the shores of the oceans to react to form the larger molecules necessary for life to develop.

These pioneers laid the scientific bases for the present experiments in chemical evolution—many supported by the National Aeronautics and Space Administration (NASA). Of the several ways to attack the

Human lung cells greatly enlarged: Tissues are red. Genetic material seen in greenish objects—DNA is yellow and green spots, RNA red and orange spots.

problem of the origins of life, one is to duplicate the conditions and primordial soup in which life arose.

Making primordial soup is not as complicated as it might seem. In its most rudimentary sense, every living thing—man and microbe alike—may be looked upon as the result of interactions between proteins and nucleic acids (DNA and RNA), those long molecular strands in the form of double helixes which carry the information for the genetic characteristics of all living things. The DNA and RNA molecules, while very large, are made up of only five different nitrogen-containing organic bases and two five-carbon sugars, linked together by phosphoric acid. Similarly, a large protein molecule is merely a string made from 20 different amino acids.

Dr. Cyril Ponnamperuma, a Ceylonese-born chemist who headed the chemical evolution laboratory of NASA's Ames Research Center for nine years, states it succinctly: "The alphabet of life is obviously extremely simple—a handful of chemicals are responsible for the vast variety we see in the entire biosphere."

The raw materials of life are assumed to have been hydrogen, helium, carbon, nitrogen and oxygen, the same elements now found in the sun and the stars. With the exception of helium, an inactive gas that cannot combine with anything, these are the very elements which make up 99 percent of living matter. (Dr. Ponnamperuma observes that "the aphorism that we are the stuff of which stars are made is more than rhetoric.") These elements reacted, creating a mixture of methane, ammonia, water vapor and small amounts of hydrogen. And it is this mixture of gases that chemical evolutionists use in their laboratory experiments

In previous issues of SMITHSONIAN, *Irene Kiefer has written on such diverse topics as shark research, regional planning and bioluminescence.*

In Stanley Miller's classic 1953 experiment, which he repeats here, he exposed a synthetic "primeval atmosphere" to electricity and got organic molecules.

to stimulate the primitive atmosphere of planet Earth.

The mixture reacts readily when exposed to energy —and there was energy aplenty on primitive Earth. The most abundant source was ultraviolet light from the sun, but the most effective source may have been electrical discharges from lightning. Because this energy is available closer to the surface of the Earth than ultraviolet light, the molecules it produces are likelier to find their way into the oceans. Still other sources of energy were radiation from the disintegration of uranium and other radioactive elements in the Earth's crust; heat from volcanoes, hot springs and the sun; and shock waves from the impact of meteorites or claps of thunder. Varying sources of energy in varying intensities would promote many different chemical reactions yielding different end products.

One of the first experimenters to test in the laboratory some of the theories concerning the origin of life was Melvin Calvin of the University of California at Berkeley. In 1951, he beamed particles from the

Berkeley cyclotron into a mixture of carbon dioxide and water and obtained significant amounts of simple organic chemicals.

What has turned out to be the classical experiment in chemical evolution was performed in 1953 in the University of Chicago laboratory of Harold Urey. Stanley Miller, one of Urey's graduate students, exposed a gaseous mixture of methane, ammonia, water vapor and hydrogen to a lightninglike electrical discharge (above). The result was amino acids and other organic molecules found in living systems. Since then, this experiment has been repeated again and again, using various kinds and amounts of energy. Scores of different chemical pathways have been explored and new molecules identified.

To date, much of the work has focused on how the building blocks of proteins, amino acids, are made, since they are relatively easy to detect. About half of the common amino acids have been synthesized in the laboratory. The general pathways by which they are formed are now known, though significant details remain unknown.

Recreating the nucleic acids is moving more slowly. Of the five bases involved, only one has been identified in the end products of experiments starting with a primordial atmosphere. In 1963, the year after he received his doctorate under Melvin Calvin, Ponnamperuma produced the base adenine using one of Berkeley's linear accelerators. Earlier, in 1960, Juan Oro of the University of Houston had also produced adenine by heating hydrogen cyanide and ammonia.

The sugars involved in nucleic acids have not been synthesized directly starting with primordial atmosphere. However, the molecular precursors of both the DNA bases and the DNA sugars have been identified, and starting with these precursors, the bases and sugars have then been synthesized.

Synthetic cells and fossil cells

The next stage is to link these basic building units together to give the larger molecules that eventually lead to proteins and nucleic acids. Again, the protein process is better understood, and substantial numbers of amino acids have been linked together into molecules approaching the size of proteins. However, a certain amount of controversy accompanies all the synthetic work, since the experimenters don't always agree on what starting materials and conditions are cricket to use in simulating what happened on primitive Earth billions of years ago.

The basic unit of life is the cell, and some of the studies in chemical evolution are trying to recapitulate the steps by which proteins and nucleic acids were organized into cells. Ponnamperuma calls this "the twilight period of transition from chemistry to biology."

Several models have been proposed to explain the origin of the first cell. One is the brainchild of Sidney Fox and his associates at the University of Miami. Fox heats amino acids, then dissolves the protein fragments formed in boiling water. As the mixture cools, large numbers of hard spheres the size and shape of bacteria form. Sometimes, budlike structures form on the spheres, which Fox believes may be a very primitive reproduction process, thus perhaps answering the question of what came first, the protein or the DNA.

A number of other models have been proposed, but, as with most of the work in chemical evolution, actual proof of what happened on primitive Earth billions of years ago is nearly impossible.

The attempt to make the molecules of life is but one phase of the study of life's origins. A second part is retracing the path by which life began by looking for clues in ancient rocks and sediments.

During the mid-1960s Elso Sterrenberg Barghoorn

and his associates at Harvard found microfossils resembling common blue-green algae in a rock formation in South Africa that is more than three billion years old. The appearance of algae in the primordial seas may well have marked the beginning of life on Earth. Not an isolated event, it probably occurred in many places at about the same time. Consequently, somewhere in the Earth's first billion years, life must have been evolving, and there should be precursors of life—or molecular fossils—that would indicate that the process of chemical evolution was indeed underway.

In the last year, researchers found rocks in southern Greenland that may be 3.98 billion years old, but no analysis has yet been made for organic chemicals. In any event, the analyst faces formidable odds in this type of work. First, many of the organic chemicals have probably been consumed by bacteria. Even then, if he did find some—and the amounts would be extremely small—he would still have to be able to determine if they were precursors of life or merely the remnants of living organisms.

Foiled so far in their attempts to find molecular fossils on Earth, students of chemical evolution have looked to the rocks of other parts of the solar system. For, according to the tenets of chemical evolution, the Earth is just a model laboratory, a place in which to observe what has taken place many times—and may even be taking place now—throughout the universe.

Until the Apollo 11 mission in 1969, meteorites were the only available source of cosmic matter. About two percent of the 800 or so meteorites that have been recovered after falling on the Earth contain carbon, sometimes as much as five percent. For almost 150 years, scientists have analyzed them for the carbon-containing materials that could indicate the presence of extraterrestrial life. Some have claimed to have detected various organic chemicals, including amino acids, but the problem of contamination has made the claims suspect. And no wonder: No more than the smudge of a finger leaves traces of the 18 most common amino acids.

Then, just before noon on September 28, 1969, a bright flash was seen in the sky near Murchison, a small town about 85 miles north of Melbourne, Australia. An object exploded in the sky, and 180 pounds of meteorite fragments fell to the ground. Not long after, Ponnamperuma received a telegram from the Smithsonian's Center for Short-lived Phenomena notifying him of the meteorite's fall. He had worked with meteorites years before but had given up because of the contamination problem. Now, because of the precise and contamination-proof techniques developed by him for analyzing the moon rocks and a freshly fallen sample, Ponnamperuma was anxious to tackle meteorites again.

A number of stones were soon on their way to him at Ames Research Center near San Francisco. Analyzing a core sample from a stone having the fewest cracks and the least exterior contamination, he detected 18 amino acids. Twelve are not found in proteins made on Earth, so their presence indicates they must be of extraterrestrial origin.

The other six amino acids are commonly found on Earth—with a slight, but very important difference. Waves of natural light, which radiate in many planes, can be polarized into one plane by passing them

Ponnamperuma found "the first conclusive evidence of chemical evolution occurring elsewhere in the universe" in this piece of the Murchison meteorite.

through a prism. When polarized light is passed through amino acids, it is rotated slightly to the right or left. With extremely rare exceptions (the cell walls of certain bacteria), amino acids found in the proteins of living organisms rotate light only to the left. Outside the living world, all molecules showing optical activity consist of equal amounts of left-handed and right-handed forms, which are mirror images of each other. But life on Earth uses only one form, and that is the left-handed form. Ponnamperuma explains: "A large, sound and sturdy protein molecule just couldn't be made by using both forms—it's like trying to put a right foot into a left shoe. We don't know why nature chose left."

In contrast to the one form found in proteins, the Murchison meteorite's protein amino acids are almost equally divided between left-handed and right-handed, additional evidence that the amino acids are not the results of earthly contamination. Ponnamperuma believes that the mixture was formed in one of the steps of chemical evolution, and he terms his findings "probably the first conclusive evidence of chemical evolution occurring elsewhere in the universe."

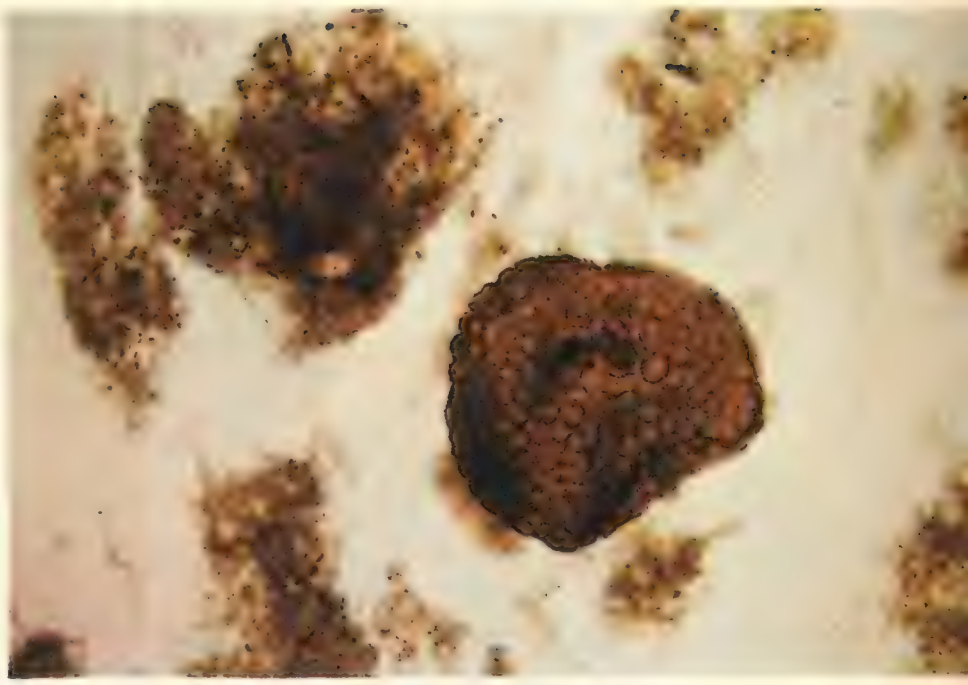
Last September Ponnamperuma and his associates announced that they had found six amino acids and eight "pyrimidine" chemicals in the Orgueil meteorite that fell in France in 1864. The pyrimidines are similar to the pyrimidine molecule that is one of the bases of the DNA molecule.

From meteorites to the planets

In the new chemical evolution laboratory he set up last fall at the University of Maryland, Ponnamperuma is extending his work on meteorites. Using samples from the Smithsonian's large collection, he will be able to analyze almost all of the 15 or 20 carbon-containing meteorites that have ever been recovered.

In addition to meteorites, the moon rocks collected by the Apollo missions have provided new grist for the mills of the chemical evolutionists. When small amounts of carbon—under 0.02 percent—were found in the rocks brought back by Apollo 11, 12 and 14, samples were turned over to three groups of scientists (Ponnamperuma's at NASA, Fox's at Miami and Bartholomew Nagy's at the University of Arizona) so they could determine if any organic molecules of biological significance were present.

The significance of what they found is still unresolved. A few parts per billion (well under 0.000001 percent) were detected, and Fox believes this shows the existence of precursors of amino acids. He says that chemical evolution may have stopped at that stage owing to lack of water. But despite all the precautions taken in the examination of the lunar samples, Pon-



Early life forms: A colony of primitive cells was fossilized in 300 million-year-old Australian rock.

This microorganism and its unusual branching filament lived some 400 million years ago.

The 600 million-year-old *Eosphaera,* found in a Canadian formation, has no comparable living form.

namperuma claims so small a quantity of organic molecules can be explained away as contamination.

The results from the first three Apollo samples came as no surprise to Ponnamperuma. "The rocks were gathered on the surface of the moon. Since the moon has no atmosphere to protect it from radiation, any amino acids that might have been present on the surface would have been destroyed after billions of years."

Nor is he optimistic about the Apollo 15 sample, which he's about to start on. Although the dust came from 15 to 30 feet below the moon's surface, its carbon content is about the same as the earlier surface samples. He believes samples will have to come from a considerably greater depth—perhaps several hundred yards—before any chemical forerunners of life are likely to be found.

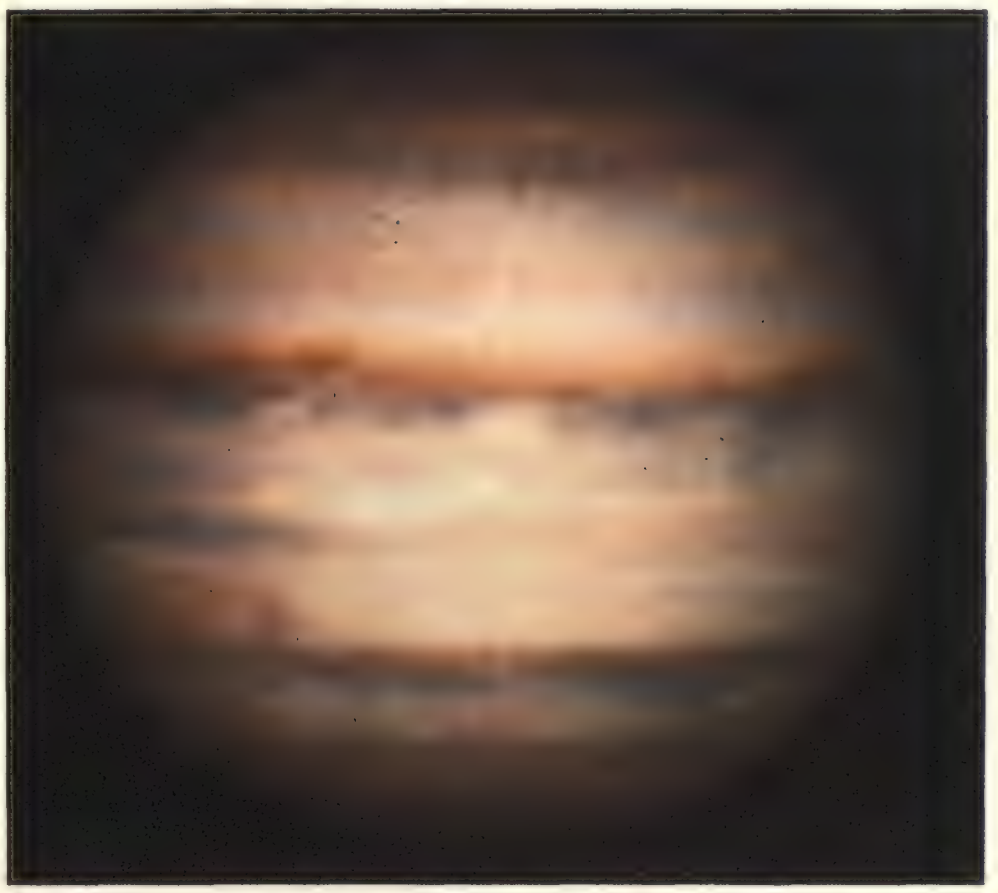
With the moon apparently lifeless, the search for life —or prelife—is turning to the planets. Mars has been selected as the most promising available target (see SMITHSONIAN, October 1971).

Another planet coming under closer scrutiny is Jupiter. In March, Pioneer 10 took off for its 600- to 700-day trip to the largest of the solar system's planets. Despite its great distance from the sun, Jupiter still may be able to support life, or prelife processes, for recent studies show it has the necessary raw materials and energy. Jupiter fascinates chemical evolutionists because it is a contemporary model of a primordial planet. Since it is so large, it has held its early atmosphere, so the processes occurring there now are probably very similar to those that occurred in the prelife period on Earth.

In one series of his experiments, Ponnamperuma believes he has explained the great red spot of Jupiter, which astronomers have theorized about since the 19th century. He says the red spot is due to the presence of ruby-red organic molecules formed when a mixture of methane is exposed to electrical discharges. Some time ago he made the chemical in his laboratory and says it could be made readily in the Jovian atmosphere. He thinks the chemical may also explain the red colors that are seen in the planets Saturn and Uranus.

While present spacecraft confine efforts in exobiology to the solar system, astrophysicists are providing new evidence from outer space to bolster the studies in chemical evolution. In 1968, University of California scientists, using a radiotelescope, detected ammonia molecules in the center of the Milky Way galaxy. Since then colossal clouds of organic molecules have been identified in interstellar space, and more than a score of different prebiotic molecules have been found.

No one of the many chemical evolution studies now underway will reveal the secret of life's beginnings. But they are slowly filling in the details and, of the eventual outcome, Ponnamperuma is confident: "There is no reason to doubt that we shall rediscover, one by one, the essential conditions which once determined, and directed, the course of chemical evolution. We may even reproduce the intermediate steps in the laboratory. Looking back on the biochemical understanding gained during the span of one human generation, we have the right to be quite optimistic. In contrast to unconscious nature which had to spend billions of years for the creation of life, conscious nature has a purpose and knows the outcome."



The Pioneer 10 Spacecraft will swing around Jupiter in December 1973 and perhaps will explain the nature of the planet's mysterious red spot (above).

Ponnamperuma has made a ruby-red organic molecule by exposing a methane mixture to electricity, as shown here. He thinks this is what the Jovian spot is.

By Doris M. Ewing

A Mt. McKinley attack on trash

Seven young climbers made the first assault on the highest garbage dump in America, but there's plenty left on this Alaskan peak

Of all the local campaigns in the last couple of years to clean up litter and trash, perhaps the most unusual effort was conducted by seven young men 17,200 feet up on Alaska's Mt. McKinley. The expedition was led by Gary Grimm, the 32-year-old director of the Outdoor Program at the University of Oregon.

Dumping garbage and excess baggage has always been an integral part of mountaineering. In the especially strenuous work of climbing at high altitudes, mountaineers lighten their loads by discarding everything they no longer need.

James Whittaker, member of the successful 1963 American Everest expedition, has written: "Having stood and examined the highest junkyard in the world at 26,200 feet on the South Col of Mt. Everest, it was distressing to see how much six expeditions, two of them successful, could leave."

As part of his five-year-old program of outdoor living and environmental education, Grimm and a student, Steve Schaefers, organized an expedition to scale the summit of 20,320-foot Mt. McKinley. Seven climbers —including a 15-year-old veteran of the peaks—set out in mid-April 1971 from Eugene, Oregon.

They hoped to reach the summit with the youngest person ever to have attempted the climb, to cross-country ski up to 11,000 feet, and to make the climb economically, without a professional guide. But their

An Oregonian outdoorswoman, Doris M. Ewing has written articles for the Christian Science Monitor.

With the mountain's west buttress looming over them (left), the climbers felt an aloneness with nature that was belied, higher up, by litter.

main goal—unique in mountain-climbing history—was to clean up littered areas and haul back all of their own garbage.

Two weeks later, after storm-caused delays, they reached 11,000 feet where they found work more difficult. At 16,200 feet Grimm recorded in his diary: "A good pace is one step, three breaths and one more step, with breaks periodically."

For 18 days McKinley had been theirs alone. Now, abruptly, their oneness with the mountain was jarred. Half buried in snow, heaps of garbage scattered by expeditions before them scarred the scene. On May 9, Grimm wrote: "Found huge garbage dump at 17,200. Old snow caves filled with blown snow, but lots of garbage and latrine areas surrounded these. . . . Disgusting."

They made camp away from the debris and planned their assault on the summit. But the next morning at Denali Pass, 18,200 feet, the weather changed. Clouds built up and the wind grew gustier, forcing them back. In 60-mile-an-hour winds they descended to the garbage-strewn site.

What kind of trash does one find at 17,200 feet? Paper, cans, bottles, food, equipment new and broken, underwear, even some lightweight plywood doors. They found a dump area 100 feet square, perhaps larger, with maybe 40 percent being human waste.

"We made incinerators out of our food cans," Steve Schaefers reported later. "As we emptied the cans, we filled them with trash, then burned it and carried down the ashes." Why didn't they leave the ashes? "It just never occurred to us to leave anything. We intended to bring everything back, and we did."

Finally, they buried what couldn't be moved, and carried out the rest, their packs now heavier than on the way up. Lower down they loaded much of the junk into nylon sleeping-bag covers, tied them to their waists and dragged them behind.

Later, when they weighed the garbage, they found they had hauled out about 380 pounds. However, 330 pounds of it was their own junk and unused food.

"I blame the guides for most of the mess," says

Storm-bound at 9,800 feet, they waited, their gear in nylon bags that proved handy in the descent.

Grimm emphatically. "One guide has a permanent snow cave at 17,200 feet, and much of the trash was found in or near his cave." Grimm says that most of the guides he has known seem to be more interested in profits than in environmental quality. "They won't bother to bring it back because their clients don't pay to carry garbage."

Recently in some areas like Mt. Rainier helicopters have been used to fly out large amounts of trash. While this may be expensive, Grimm contends that the cost should be included in the total trip expense. They would like guides to be regulated and denied access to the mountains unless they show they have done everything possible to care for the environment.

"What I'd really like to do," says Grimm, "is start a program with other schools, go back to McKinley and clean it up."

Grimm has proposed a scheme called the Denali Arctic Environment Project in which groups of climbers trained in the northwest states and Canada could choose to stay on McKinley for extended periods, while others might prefer a short-term clean-up trip. There is, apparently, plenty of garbage up there for everyone.

At 17,200 feet, garbage sacks like this one and human wastes fouled an area 100 feet square.

Having burned or buried much of the trash, they brought 380 pounds of junk back with them.

By J. David Truby

The turbulent wars that whales have fought against Man

Mightiest mammal finally faces extinction, but not without a bloody battle against harpoons, whaleboats and even steel ships

If you accept the Bible story, Jonah was the first casualty in the violent war between Man and whale. But between Jonah's day and the introduction of steam-powered, ocean-going whaling factories armed with guns shooting explosive warhead harpoons, quite a few seamen have been deep-sixed fighting the world's largest animal. Until the turn of this century, the strength and speed of whales often gave them the upper hand over the frail, two-legged animals who hunted them from boats.

Stories of 150-foot whales belong with Jules Verne. The largest whale yet officially recorded was a 107-foot-long blue whale; rarely is this species more than 100 feet. The average sperm whale is 50 to 60 feet long. Men hunt these giants of about 50 tons because their bodies yield as much as 90 barrels of valuable sperm oil apiece (although overhunting has drastically reduced both the size and the oil yield of sperms in recent

Panoramic scene from the 1840s shows whaling vessels ganging up on a herd. Whaleboats, with harpooners in their bows, row in to attack.

years). And since "professional" whaling began, probably in the 11th century, some enormously strong beasts have rammed, battered and chewed the ships and ended the lives of the hunters.

One of the initial recorded maritime casualties in the war between Man and cetacean occurred in 1807, with the sinking of the whaler *Union*. She was 20 days out from Nantucket when, according to Captain Edmund Gardner, a whale deliberately slammed into her bow. The wooden hull was shattered and the sea poured in. Captain Gardner ordered his men into their small boats and onto the dark ocean. The boats stayed together and managed to reach the Azores within eight days without any loss of life. The captain reported that one whale had left the school to attack the ship after the men lowered whaleboats to go after the other beasts. Whaling men who lost battles with the leviathans commonly reported that protection of the herd seemed to be a common cause of whales attacking ships.

The most famous confrontation was the sinking of the whaler *Essex* in 1820. On a voyage from Nantucket under Captain George Pollard, the *Essex* sighted a large school of sperm whales off the west coast of South America on November 20, and three boats were lowered. The whales damaged one of these small boats, and it returned to the *Essex* for repairs. Whereupon one enormous sperm whale began a driving charge from a quarter of a mile away, straight at the ship itself.

The force of the first ramming knocked the 238-ton ship on her beam ends. Hurt and maddened by its col-

A Pennsylvania free-lance writer, Dr. Truby dug this yarn out of museums, logbooks and the memory of an old man whose father served on one ill-fated ship.

lision, the mighty whale frothed, rolled and sounded for another attack.

"The first ramming split the ship's seams and the sea came into the hold," First Mate Owen Chase told listeners some years later. "I knew we were doomed, but the beast didn't believe that as he prepared to stove us again."

Turning, the whale built speed for another attack, while the dazed and terrorized survivors on the *Essex* frantically gathered supplies into the repaired whaleboat. Chase saw the huge beast surface directly ahead of the ship's bow. The whale hit the *Essex* a shuddering blow, splintering timbers and allowing water to pour into the ship. This second blast shattered the *Essex,* and she lay on her side, the sea filling her slowly. Seemingly satisfied, the whale led his school away as the men struggled to provision their small boats.

The fate of the three boatloads of men is one of the sea's most grisly stories. It was recorded in Owen Chase's rough diary, which was later published under the title, *Narrative of the Most Extraordinary and Distressing Shipwreck of the Whale-Ship Essex of Nantucket*. The three boats managed to stay together on the lonely sea for nearly two months. The only land they saw in that time was tiny Henderson Island, on which three men decided to remain, fearing the terror of the open sea. It turned out to be a wise choice.

The other 17 men pushed off. On January 12, 1821, a storm separated Chase's boat from the two others, which were in turn separated on January 28. One was never heard from again. Only ten men were then left alive in the boats, suffering from thirst, hunger and madness in their half-swamped craft. The boat containing Owen Chase and two surviving seamen was picked up on February 19. They admitted to cannibalism to stay alive. Within a week, Captain Pollard's boat was picked up. The Captain and one seaman were barely alive—having subsisted for three weeks on the flesh of their three shipmates who had died. The men had been on the open sea for a quarter of a year!

The three men on Henderson Island were rescued several weeks later and found to be in far better shape than their five cannibalistic comrades. Of the 20 men who'd left the *Essex,* only eight lived.

This true horror story fueled the imagination of America's most famous seaman/writer, Herman Melville. He later served on the same ship as Owen Chase's teen-age son, and the two became friends. William Chase shared his father's diary with Melville, who was fascinated by the ordeal of the *Essex* crew. Other whaling legends added to Melville's idea for a book, but the *Essex* tale was its base. However, it was nearly a decade before *Moby Dick* was published, in 1852.

Of course, Melville's story of the great white whale and Captain Ahab was fantasy—or was it? In July 1840, two whaleboats of the British ship *Desmond* were shattered by a huge white whale. When a third boat set out to rescue survivors, the beast chewed it apart. One of the witnesses aboard the vessel *Desmond* said the "hellish white serpent [sic] was at least 100 feet long!"

The *Desmond*'s skipper was also impressed, adding

Captain Ahab, author Melville's maddened pursuer, curses Moby Dick in this woodcut by Rockwell Kent.

Moment of truth for the whaler *Essex*. The 238-ton ship is charged by a whale—here shown as a right, though records say it was a sperm.

in his log, "That whale got one boat, then the other, and the third . . . a planned attack. Two of my crew disappeared . . . just gone . . . the beast no doubt swallowed them whole or chewed them to pulp."

Within a month, the Russian bark *Serepta* was attacked by a large white whale more than 500 miles south of the area where the *Desmond* had been battered. The whale smashed three more whaleboats and rammed the bark. The ship retreated under jury rig after picking up dazed survivors.

In January of the following year, the skipper of the British whaler *John Day* decided to hunt down this white monster. By then, seamen were calling the animal "Mocha Dick" because he was said to have sunk his first victim near the Mocha Islands off the coast of Chile. Determined to end the attacks, the *John Day* stalked the whale for several months; then Mocha Dick found the British ship late in May 1841. The battle was short and violent. The men managed to get one harpoon into the big mammal before it destroyed two whaleboats and damaged the *John Day,* costing five casualties. The humans retreated.

Months later, the legendary Mocha Dick fought his greatest battle off the coast of Japan. He attacked and destroyed a freighter, then decided to take on three nearby whalers—one American, one English and one Scottish. The commanders of the three ships held a council of war while their huge adversary floated a mile away, watching the vessels. Six whaleboats set out, and the men managed to sink several harpoons in Mocha Dick. Playing dead, the monster lured the six boats in. Then he attacked. He reportedly battered and sank three whaleboats, then picked up a fourth, shook it as a terrier would a rat and smashed it in his

A gigantic broaching sperm splinters a whaleboat in this imaginative print. Men, oars and a tub of harpoon line fly high above the great square head.

jaws. Dazed, the officers of the two remaining boats picked the few survivors from the bloody, littered water and retreated.

But Mocha Dick wasn't done. He sounded, then came roaring up under the large Scottish vessel as it was taking aboard the injured. The collision knocked the ship around and smashed her bow. Sounding, Mocha Dick went into a shallow, torpedolike attack on the smallest whaler, the American. He struck it hard just forward of the stern. The deck buckled, a seam split and water started coming in. But the ramming bloodied and dazed Mocha Dick, and while he rested his human enemies decided to flee.

According to contemporary sources, all three ships quickly made sail for the Japanese mainland. The Scottish ship was badly damaged, the American vessel moderately. However, 13 men had been lost (only two bodies were found) and 26 injured—some seriously.

Of course these "great white whale" attacks could not all have been made by the same beast. Attacks by large Pacific gray whales, several of truly mammoth size—estimated at 80 to 100 feet—were also documented. In 1859 a Swedish ship bested an old white bull whale, blind in one eye and carrying 19 harpoon heads in its tough hide. Was it the veteran of the battle off Japan? Another old white male was taken in 1902, with numerous scars and 11 hooks buried in it. In any case, at least three whalers, 18 whaleboats, three barks, four schooners, two freighters and 117 lives were reported lost to the Mocha Dicks—most of them probably Pacific grays, although the one taken by the Swedes in 1859 was a 70-foot albino sperm whale.

The repeated observation in the diaries, reports, logs and interviews of officers and men who have witnessed whale attacks is that these were not chance happenings of maddened beasts. Owen Chase wrote that the whale which destroyed the whaler *Essex* "made two attacks calculated to do us the most injury by combining the speed of the two objects (whale and boat) for shock."

A large whale can attain a burst of speed of up to 20 knots, generating about 520 horsepower with his huge body. Match that against the maximum six- to eight-knot speed of the ships of the day, and the massive damage reports are easy to believe.

In 1850 the whaler *Pocahontas* attacked a wounded whale after losing its whaleboat to the mammal. The beast retreated, sounded, then apparently changed course under water. The shocked crew suddenly saw some 80 tons of angry whale charging straight at their ship. The collision scattered men like bowling pins, killing two. The captain rushed below and found the wooden hull smashed away with only the copper inner sheathing between him and the ocean. Fortunately, the dazed whale did not renew its attack. Emergency patches and round-the-clock hand pumping for 15

days brought the listing vessel into Rio de Janeiro for repairs. Privately, not one of the officers had figured on seeing land again.

The fate of the *Ann Alexander* is another story of mere men clashing with the king of the ocean. A large sperm whale suddenly charged three whaleboats, smashing one and chewing up another. Officers and crew fled to the main ship in the remaining whaleboat. The beast then charged the large ship, missing her the first time. An all-day chase and battle then raged between ship and beast with both taking turns at offense and defense. Around dusk the whale sounded. After 15 minutes, there was no sighting.

As darkness fell, Captain John Deblois went below, exhausted, as did all his crew but a skeleton night watch. Half an hour passed.

"Thar she. . . ." There was not even time for the lookout to complete the traditional cry before the mighty beast was slamming into the ship in the murk.

"It was a sight from hell . . . a mighty, black shadow looking taller than our poor ship," Captain Deblois later wrote of the attack. "The beast stove us abreast of the foremast about two feet from our keel. He hit us hard at 20 or 25 knots speed."

The *Ann Alexander* went down. By the time the officers and crew had hurriedly gathered a few provisions, weapons and navigational equipment into their two remaining whaleboats, water was already three feet deep in the captain's cabin. As dawn greeted the frightened survivors in their own open boats, they must have thought of the horror that haunted the men of the *Essex* in the same waters only 31 years before. However, whalers were now abundant in that area, and the men were picked up on their second day afloat in the open ocean.

Although reports of the beasts attacking ships continued throughout the last half of the 19th century, Man used technology to tip the battle in his favor: large, fast steamships and gun-fired harpoons with explosive warheads. There were only two reported sinkings of ships over 60 tons between 1870 and 1890. However, this may not be a clear battle report. According to historian Kermit Kensinger, "Many smaller vessels, including whale hunters in ships of 40 to 60 tons, with a dozen or so men as a crew, went out and never came back . . . lost with no trace or survivors. We can assume, since many of these were hunting whales, that the whales simply won the battles in some cases."

Whales versus iron ship

The whales made three more infamous sorties after 1890. On a clear day in 1896, the passenger steamer *Seminole* passed Sandy Hook. Suddenly, a lookout spotted whales surfacing just ahead of the steamer. Too late to stop or veer, "We hit one of the poor beasts right over top of him," an old seaman on the *Seminole* recalled. "It must of broke his back, but the collision sure shook the ship."

The accidental ramming sent furniture flying all over the ship's saloon and jarred passengers. But, this disturbance was minor—considering what was to happen in the next 15 minutes.

"The blood was all over the sea around us," the crewman's story went on. "We sure hurt that whale, and he must have somehow told the other ones, 'cause they all headed right for us . . . awfulest damn thing I ever saw in 35 years at sea!"

According to the *Seminole*'s purser, the other whales —five were counted—sounded several hundred yards out, then launched from the sea and rammed into the ship at a tremendous speed from only about 30 or 40 feet away.

"The first two hitting us drove the ship sideways . . .

Bloodied whales batter the 2,557-ton steamer *Seminole* after she churned over one. They left her iron plates "dished," her seams sprung open.

spilling passengers and crew," the purser later noted.

The other whales also hit the ship, then all dived for the depths to pick up speed for a second attack. Blasting in like pro-football linemen, the whales hit the iron ship almost all at once, throwing people and furnishings about wildly. The engine room reported machinery broken loose by the impact. An officer said the sea was leaking through ruptured seams.

"The whales were hurt, there was blood all over the water, but they were coming for the third charge at us. This time they hit us one after another, the purser told newsmen later. "I guess they were tiring, and they had to chase us now, as the Captain ordered all possible power to speed us away from them."

The side of the *Seminole* looked as if giant fists had beaten on it. The massive steel hull plates were bent as easily as a grown man might bend a thin aluminum pudding dish. Battered, running on partial power and with injured aboard, the *Seminole* made Jacksonville.

"We figured the whales at 60 to 80 feet long," Captain Bearse later reported. "But, one of our men had been on a whaler a few years earlier and thought one of them was much bigger than that . . . maybe 100 feet long."

There was another attack that same year. Heading north with a load of lumber, the schooner *Aetna* was five days out, off Cape Hatteras, when the captain and his mate spotted a dozen whales bearing directly down on them.

Captain Jonas ordered his ship's course altered. He noted that "as soon as we changed, they all went under the water, so I thought that was the last of that and went below."

Surrounded by whales

Before he could even strip off his jacket, Captain Jonas was knocked off his feet by a massive, splintering smash that shoved the 250-ton schooner over on its side. The Captain crossed the tilted cabin—and later recalled: "I rushed up on deck. The water around us was boiling to a fury. We were in the middle of the school of whales. My Mate, Mr. Morris, had cut his head on the bridge railing, but had the wheel under control."

The second whale hit the ship like an enormous erupting missile and smashed the starboard hull planking like matchwood. The ship shuddered to a stop as the beast tried to surface directly under it. The heavy schooner, loaded with 290,000 board feet of pine, had her keel lifted almost totally out of the water. Suddenly, the whale sounded, and the ship smacked down into the water again—hard enough to run the decks awash.

"The whales kept on going, but it was several hours until we could repair both our injured crew and ship, and get under way again," the first mate reported.

Finally, in 1902, the American bark *Kathleen* was attacked by a large sperm whale which battered the ship several times, finally sinking it. With barely enough time to load bread, water and themselves into lifeboats, the crew launched their small, open boats into the middle of the Atlantic Ocean. The big whale circled the boats for an hour, then suddenly swam away. Three boats of terror-stricken sailors were rescued the following morning, while the fourth lifeboat—separated during the night—sailed 1,000 miles in nine days, finally reaching Barbados. The survivors of the *Kathleen* said they had all thought "much about the poor devils on the *Essex* and wondered if history would repeat herself with us."

That was the whales' last hour of victory. Since then little has gone their way. Perhaps the fate of the cetaceans will be just another legend of the sea—a memory from the past. Man has got whale-killing down to a science for some years now, and the great mammals are on the list of very scarce animals, in spite of international efforts for protection, as human avarice again overcomes human reason.

Mighty flukes of a gray whale, encrusted with barnacles, mark the animal's diving escape from Man.

Next month: Jacques Cousteau on killer whales

According to Soviet versions of recent history, the whole of Leningrad should have been pounded flat by the 900-day Nazi siege in 1941-44; more than 107,000 enemy bombs and 250,000 shells are said to have rained on the city. Hitler's massive attack was intended to put an end to the former "City of Peter" once and for all. But it did not. The Germans got no closer than a small range of hills ten miles to the south, and there they stayed for the whole of the appallingly cold winter of 1943.

The archives show that Hitler planned to hold a mammoth victory parade in the resplendent Palace Square (below); and I have heard it said that the Nazi generals were looking forward to a victory dinner at the Astoria Hotel (still the city's best), and that that is why they desisted from leveling the old city center. In any event, this part of Leningrad survived very largely intact, and remains one of the most perfectly preserved examples of late 18th-century streetscape anywhere in the world.

Since the war, Leningrad has refrained from making the slightest alteration in the city center that could mar its historic elegance. As far south as the Baltic Station you can see evidence of the city's concern for preservation. When a house needs to be rebuilt, as many do, the inside may be restructured but the facade is left intact. Not until you reach the Leningradskaya Hotel north of the River Neva or the Sovietskaya to the south do the harsh matchbox outlines of contemporary architecture intrude. High-rise towers and modern workers' housing are confined to the suburbs. In the heart of Leningrad whole streets remain very much as they were described by Dostoevsky and Tolstoy in their novels.

In the West we have cheerfully bulldozed ancient and noble buildings belonging to our honored past, mouthing as we do so our deep concern for our cultural heritage. Russians in Moscow seem prepared to do the same, and that difficult city is studded with excrescences of what passes there for modern archi-

Palace Square on one of Leningrad's famous "white nights," when the sky never really gets dark; the streaks of light are from passing cars. The granite column commemorates Czar Alexander I.

By Vivian Craddock Williams

Beautiful ghosts from the past: the paradox of Leningrad's revival

Ignoring ideology, Russia's second city cherishes its Czarist relics and has made them into models of enlightened preservation

Photographs by Ian Yeomans

Women workers pause in their reconstruction of
Catherine's Palace at Pushkin, formerly Tsarskoe Selo.

tecture. But Russians in Leningrad value their old city too highly for that, and the paradox of their palaces is that, despite the dominant position Leningraders have in the forefront of Soviet Communist thinking, they all seem to share an intense and possessive feeling for their Czarist architecture.

A short time ago there was a public outcry when the Chesma Palace, a halfway house built for Catherine the Great between the Winter Palace and Pavlovsk, 20 miles away, was removed to make way for a road. And this was a building that had long since lost its original outlines and had been a derelict factory for more than 100 years.

Again, last year, it was suggested that Leningrad's longest and finest street, the great Nevsky Prospekt, should be redesigned with what was described as "a continuously aligned shop window." The proposal brought furious letters of protest from the citizenry, and for some weeks *Vecherny Leningrad,* a forum for local opinion which on architectural matters has surprising freedom of expression, was full of the city's outraged reaction.

Leningraders have such affection for their city that many lapse into calling it St. Petersburg or simply "Peter." Peter the Great founded the city in 1703 as his "window on Europe," and St. Petersburg was its name until 1914, when aroused nationalism prompted a change to Petrograd. It became Leningrad in 1924, after the death of Lenin. Until the Revolution it was the seat of the Romanov dynasty and, until the capital was moved to Moscow in 1918, the center of Russian political life.

The palaces of St. Petersburg were designed as settings for what was perhaps the most conventionally "European" aristocracy of the 18th century. Russians then felt painfully remote from the mainstream of life and, to cement their tenuous links with the West, tended to overplay their Europeanism. Having founded the city, Peter went on to build a summer palace on the Gulf of Finland that was meant to rival Versailles. Designed by Leblond and Rastrelli, and called Peterhof (characteristically, Peter gave it a German rather than a Russian name), it is a confection of fountains and gilded statuary (page 70). The Empresses Elizabeth and Catherine the Great brilliantly continued what Peter had begun. St. Petersburg became a glittering constellation of palaces, in some cases of facades only. Apart from Rastrelli's baroque extravaganzas, which permanently influenced Russian taste, the classical orthodoxies stemming from the excavation of Pompeii in 1748 were tenaciously pursued.

When the Romanov dynasty was finally smashed by Lenin and the Bolshevik Revolution, it was in some ways odd that the palaces were not smashed, too. As in the French Revolution of 1789, the unleashed peasantry burned a great many houses of the rich in the Russia of 1917. But the Bolshevik leaders officially condemned looting and destruction. Lenin ordered pickets to be put on the expropriated palaces, and one of the edicts issued by the Soviet of Commissars headquartered in the Smolny Institute was: "This property once belonged to the landlords. It is now yours. Treat it with respect."

Far more damage was done to the heirlooms of Czardom by the Nazis than by the most nihilist of revolutionaries. Although the city center got off lightly, the outlying palaces were occupied by the Germans and were almost completely destroyed by fire or blasting when they began their retreat. Today, the more important of these palaces are being restored. Pavlovsk, the masterpiece of the Scottish expatriate architect Charles Cameron, has been rebuilt and refurnished. The vast Catherine Palace, four miles away at Tsarskoe Selo (now called Pushkin after the poet who

Restoration has been completed on the main front of Catherine's Palace, built 1749-56.

The author recently investigated the restoration of Leningrad. He is now engaged in an economic study for the government of Zambia.

lived there for a while), is rapidly approaching the state intended for it by its designer, Rastrelli, although the famous Amber Room, whose honey-colored wall lining was stolen during the war, will probably never be reinstated. And Peterhof, now officially called Petrodvorets, is in the final stage of its lengthy restoration.

The perfection of the work being done has won the admiration of everyone who sees it; were it not for the photographs of the burned-out palaces taken the week after the Germans left, it would be difficult to credit the miracles achieved. The massive undertaking has been organized with a typically Russian mixture of intelligence, thoroughness and brute force by the Inspectorate of Public Buildings, part of the State Commission on Historic Buildings, which in turn reports to the Soviet Ministry of Culture. Mrs. Klavdiya Pavlova, the director of the Inspectorate, has a list of responsibilities that includes more than 500 palaces in the Leningrad area, along with 400 churches and other monuments. Her budget for the work has been running at 15 million rubles a year (at the artificial rate of exchange maintained by the Soviet government, about $17 million), of which one-third is provided by the Leningrad Soviet and two-thirds by the Ministry of Culture in Moscow. By most Western standards this is generous financing, but Mrs. Pavlova says they still have ten years' work to do, and hints that, if it were not for the devoted labor of unpaid trainee restorers and the high competence of the Artists' Union, completion would take even longer.

Endless pains are taken to restore details exactly as they were, using old photographs and drawings from surviving archives to achieve minute fidelity of style. In a very few places gold paint has been used in the restorations, but the policy now is to employ only the best gold leaf, with dazzling effect. More than 200 pounds of gold were used in the restoration of St. Isaac's Cathedral in 1965, and similar quantities have been applied to the Peterhof cascade statuary.

The standard response to the question of why a Communist regime goes to such lengths to preserve Czarist edifices is that they are monuments to Russian artistic skill. "These palaces do not remind us of Czarism," Mrs. Pavlova says. "They represent the tradition of Russian art and the highest achievement of Russian craftsmanship."

These are understandably nationalist sentiments, and it is kindest not to hurt Russian feelings by reminding them that the creative impulse that produced St. Petersburg was largely, if not entirely, imported from Western Europe. Peter the Great brought in so many craftsmen that they defy comprehensive listing, and Catherine the Great employed the French *philosophes* Voltaire and Diderot as agents in the wholesale requisitioning of art and artists. Her Russian artists were largely imitators of European masters. It may be that the Soviet authorities have undertaken their vast programs of restoration as a matter of national pride, to show that Russians can build palaces again by themselves. But it is one thing to create a style, as Rastrelli did, and quite another to re-create it.

There is a further explanation. Communist dogma posits the supremacy of the People, who therefore deserve access to what is theirs by right—the enjoyment of the former sovereign's palaces and parks. It was the belief that the Soviet people merited nothing less than the best that inspired the lavish but archaic decoration of the Moscow subway stations built in the 1930s, with their marble and chandeliers and regal door embrasures.

The idea of Soviet public property was put very neatly for me at the House of Friendship in Leningrad, an agreeable international social center housed

Restored fountains and cascade at Peterhof,
Peter I's summer retreat on the Gulf of Finland.

A room in the Shuvalov palace, photographed a week after Nazis had given up their bombing attacks.

The same room, fully restored (below), now serves as part of an international social center.

in the former Shuvalov palace. As Miss Katherine Greckova showed me through the sumptuous rooms with unconcealed pride, she explained: "This palace once belonged to the rich merchant Marishkin, whose daughter married Count Shuvalov. He gave them this palace as a wedding present. We think it was rather a large place for two people to have to themselves. Now it belongs to us, and everybody can come here when they like."

Actually, the House of Friendship is closed over weekends, and the Inspectorate of Historic Monuments makes strict rules about which rooms can be used for what—even "where drawing pins can be stuck in," as Miss Greckova told me. I found these jurisdictional distinctions intriguing. They show how close the Soviet bureaucratic elite can come to having a bourgeois sense of property.

The policy on restoration is subject in Russia, as elsewhere, to pragmatic considerations of finance and the availability of expert skills. The highest priority has naturally been given to restoring those palaces most usefully situated in the center of Leningrad, and few of these are empty or unused. Several churches deserving restoration remain closed, presumably as a gesture of the official discouragement of all religions. But the Kazan Cathedral was early converted into a Museum of Religion and Atheism and St. Isaac's into a museum of religious art. In place of the high altar in St. Isaac's, a Foucault pendulum demonstrates with measured irony the rationally ascertained rotation of the Earth.

Similarly, in some of the Romanov palaces, points could be made about the substitution of "popular" for Czarist rule, but at the moment they are presented to Leningraders and to all who come to see them as palaces of pleasure and public utility rather than as propaganda exhibits.

The Grand Duke Andrei's palace overlooking the Neva is now the Palace of Marriages, where civil weddings of young Soviet couples are performed to the taped strains of "The Leningrad March." The old Bourse is a naval museum. Count Sheremetyev's former palace on the Fontanka is the Arctic and Antarctic Scientific Research Institute. Prince Yussopov's palace on the Moika Canal, where Rasputin was murdered, is a teachers' cultural center. The Smolny Institute, once a private school for the daughters of the St. Petersburg aristocracy, was Bolshevik headquarters in 1917 and is now a hallowed shrine to Lenin's memory and the Leningrad Communist Party headquarters. Count Stroganov's palace a little farther down, where some flavorsome beef was concocted in his day, is now an office of architectural design—presumably of a kind Rastrelli would approve.

Crowning the palatial nexus beyond the Admiralty is the superb Winter Palace (left), Rastrelli's masterpiece, which now houses the unrivaled art collection of the Hermitage.

It is indicative of the way in which love of old St. Petersburg dominates allegiance to Communist dogma that the Winter Palace has been restored to its original design. Contrasting vividly with the white window frames, the walls of the palace have been painted light green as Rastrelli specified. In Czarist days the Winter Palace was painted red—the color of the future Revolution.

The most magnificent of Leningrad's palaces is the Hermitage, formerly the Winter Palace but now the home of Russia's greatest art museum.

Another Rastrelli masterpiece is the old Smolny Convent with its silvery gray domes, rich gilding and light blue walls.

By Donald Gould

Albion's foulest air attacked

Can three working-class women with a gift of gab and a donated typewriter get one of England's dirtiest regions to clean its air?

"If you're having a crowd of women going around forming clean-air councils, there is sure to be trouble," says Alderman Jack Brown, 72, who has been chairman of the official Teesside Clean-Air Committee since 1949. He is right.

Teesside, a new county borough in northeast England, was established in 1968 to give a respectable name to a solid, fungoid mass of asphalt, brick, corrugated iron, concrete, people and trash, from three to six miles wide, embracing and smothering the last ten miles of the Tees River as it runs into the North Sea.

Big ocean-going ships can navigate the tideway. The rich Durham coalfields nudge its northern shore. Fluorspar, salt, lead, anhydrite, limestone and iron ore are all to be had from the land on the spot or nearby. The site is a millmaster's dream.

The first big installations were steelworks and shipyards and around each a community began to grow. The steel mills have flourished and increased and they have been joined by other heavy industries, chief among which are an oil refinery and two huge chemical plants, each employing 14,000 men. Now the once separate townships have coalesced into a single, sprawling colony of just under half-a-million souls, wholly involved in the hectic and massive production of goods and profits.

Donald Gould is former editor of the magazine New Scientist, *and told of London's clean-air efforts in* SMITHSONIAN, *September 1970.*

Maureen Richardson is one-third of Teesside's clean-air alliance. Cooling towers are in background.

Though small in size, Teesside is one of the most densely populated regions in the country. Its largest town, Middlesbrough, has been distinguished over recent years by being at or near the top of the list in national crime statistics and leads in working days lost due to sickness. Teesside's death rate from respiratory causes is 12 percent above the national average. Middlesbrough's record for drunkenness has been beaten only by four English towns, seven Scottish burghs, and the southern county of Limerick in the Republic of Ireland.

These sad few acres are surrounded by hills and some of the loveliest countryside in the land. They are often fogbound and frequent temperature inversions keep both fog and chimney fumes trapped for hours or days close to the ground.

Just now eight percent of Teesside's working force are unemployed. Despite all this, the people of this

sooty basin are friendly and uncomplaining. They have tolerated the ugly, baneful and largely avoidable excretions of their employers' plants with astonishing patience and resignation.

This, at least, was the pattern until quite recently. But now trouble is brewing. To repeat what Alderman Jack Brown said: "If you're having a crowd of women going around forming clean-air councils, there is sure to be trouble."

The Clean Air for Teesside Society is a powerful alliance of exactly three women. It has already caused officials and boardrooms in the area a good deal of embarrassment and discomfort. Its three members seem to be well on their way toward shaking the citizens of Teesside out of their fatalistic acceptance of the myth that muck and money are inseparable.

The cast of characters

The mother of the trinity is called Joyce Beckley. She claims to be 45, and has mothered nine children. The second member, in terms of seniority measured by age and length of service, is Doreen Conroy. She's 44, and has ten children. The junior councillor is Maureen Richardson, who, at 27, is a mere infant. She (perhaps because she belongs to a somewhat more enlightened generation) has only two children.

The one thing the three ladies share, apart from their enthusiasm, is a working-class background. They are, and always have been, a part of the kind of industrial community whose quality of life they are now working so hard to improve. Their militant concern for the environment provides a total contradiction to the common assertion that present agitation about pollution and the threat of eco-catastrophe is no more than a passing fashion among the middle-class eggheads of the Western world.

It is perhaps significant that Joyce Beckley is separated from her husband and that Doreen Conroy is a widow. Both ladies are sure that they wouldn't be allowed to carry on with their protests and propaganda if their husbands were still around. Maureen Richardson is married to an electrician who works at one of the Teesside chemical plants; he clearly doesn't share his wife's crusading zeal. By and large the men of Teesside, and indeed a great many of their women, have traditionally disapproved of anything likely to rock the industrial boat and threaten their livelihood.

Joyce Beckley arrived in Teesside in 1956 from the pleasant, soft, southern county of Surrey. She was appalled by the grime and the smell and the general corruption of nature. But she already had her family of nine demanding children and a working husband, so she had no time for anything except anger. However, she was determined then, that once the children were grown and off her hands, she would try to do something about it.

Maureen Richardson began life in another northern industrial city, Newcastle upon Tyne, which has its grim parts but is a Venice compared to the totally unrelieved horror of Teesside. She recalls going on camping holidays with her family in the beautiful country through which the Tyne runs. There the river was clear and bright and she saw fish jumping, but she could not be persuaded to believe that it was the same river as the turbid black sewer which ran through her home city.

Maureen went to a convent school and was bright at her work. She could have done well, perhaps winning a place in a university, but she was restless and impatient of authority so she left school at the age of 15. Her father, a cabinetmaker, was proud of his clever daughter and didn't want her to leave. But now he's full of admiration for the fame she is rapidly achieving. "I don't understand pollution," he tells her. "But if you're in it, it must be important."

Maureen, married at the age of 21, came to Teesside with her husband. Like Joyce Beckley, she was angered by the needless spoliation of what had once been a glorious valley. And, like Joyce, she decided that when her infants were a little older and the opportunity came, she would try to do something about it.

The great campaign began in the early summer of 1970. It was triggered by a letter to a local evening paper from a young schoolmaster who had come to Teesside from the south. Like Joyce Beckley before him, he was appalled and angered by what he saw and he was moved to make a public denunciation of the place. In his letter he said that if he had realized what a filthy area it was, he would never have come there. He would certainly warn all his friends against a similar mistake, and he berated the citizens for their apathy in putting up with the mess.

The voice of a prophet

This outburst didn't make him exactly a popular hero. The locals were angered at this upstart from the south criticizing their home and their spirit. They stopped him in the street and taught him the sound of the rough side of a Yorkshireman's tongue. But his was the voice of the prophet Joyce Beckley had been waiting for. She wrote to him to say she had determined to start a petition among the people he had accused of apathy. She would stir them up and egg them on until they were in a mood to demand a better deal from the city fathers, the foundry owners and the fertilizer manufacturers. "Can I rely on you to come in with us?" she asked. "Oh, yes," said he.

So Mrs. Beckley set about collecting signatures to a

Some foul air attacked

petition demanding that the local authority use its powers to create clean-air zones by banning the burning of smoky coal in domestic grates, by paying toward the cost of installing stoves for smokeless fuel or some other form of heating. Local authorities have had the power to make such an order and to spend money for this purpose ever since Parliament passed the Clean Air Act of 1956. But some local councils have been exceedingly slow to use these powers, not wishing to waste good cash on such a vanity, or to upset voters set in their ways or to disturb the traders dealing in cheap, smoky, bituminous coal.

The worst laggards have been among the authorities controlling some of the most grossly polluted industrial cities, and Teesside has been second to none in its stubborn determination to stick to its familiar, acrid smoke. Mrs. Beckley was also demanding that the Teesside council should take a far tougher line with the factory managers who were careless over efforts to cut down the soot and grit and offensive gases escaping from their chimneys. But most local councillors are tradesmen or contractors of one kind or another and the large industrial concerns are often among their best customers.

If the chimney on the factory belonging to the man who buys 600 of your pies each day for his works canteen is belching smoke in quantities well beyond the legal limit, then the sensible thing to do is keep your eyes fixed on the racing results in your evening paper.

In all her spare time that summer, Mrs. Beckley tramped the streets of one neighborhood after another, knocking on doors and slowly adding to her list of petitioners. The first 500 signatures came quite easily, and Joyce Beckley's campaign attracted the notice of the local press. As soon as this happened, her original inspiration—the indignant schoolteacher from the south—disappeared from the public scene. Perhaps he had made his way back to London. Or perhaps, as prophets sometimes do, once a spark has been struck, he had gone to seek new converts elsewhere. Or perhaps somebody (his headmaster or the chairman of the local education committee) had suggested that his professional career in Teesside might run more smoothly if he kept quiet about things which were none of his business. Mrs. Beckley doesn't know.

So she tramped the streets alone. "I got quite a few signatures. I've got the gift of the gab. I can talk most of them into it. I just used to keep on and on and on at them. Mind you, there were a few stubborn ones. I remember quite well a young woman of 23 or 24 who refused to sign. I asked her why. She said she had three young children, and I asked her if they were healthy. She said no, they weren't. She said all of them *and* her husband had tuberculosis.

"Well, I said, why don't you sign? Don't you think *they* could do with some better air to breathe? 'Oh, well,' she said, 'you must *give* something if you're going to get something back.'

"For heaven's sake," I said, "I don't see why you should give your *health,* just for the privilege of working in this filthy place.

"But she wouldn't sign. You find this attitude, even in very young people sometimes. They've been brought up with it. They're told they ought to be grateful there's a job to go to, and to stop complaining."

No help from the alderman

Despite the occasional difficult customer, by September Joyce had collected more than 2,000 signatures, and she took her petition along to the town hall and presented it to Alderman Jack Brown. Then she waited for the action. Nothing happened.

"I don't think the council's clean-air committee has ever done anything at all," she says. "They just meet, and talk a lot, and that's all. Alderman Jack Brown invariably goes to sleep unless he's talking about what things were like in the old days."

Joyce Beckley decided to give the council a little time to respond to the petition, but when Christmas passed and April came and there was still only silence from the council chamber, she decided to form her own ginger group. She called it the Clean Air for Teesside Society. It started with herself and two friends, one of whom was Doreen Conroy, the second member of the present trinity.

Doreen says: "I went into it more or less out of curiosity, you know. And because of Joyce doing it, of course. Then it got really interesting."

The second friend and founding member has since dropped out, disturbed by some of the militant actions of her companions and afraid that too effective a fuss

about a bit of smoke from a chimney might close a plant down and lose men their jobs. This is an all too common fear in Teesside.

Joyce Beckley then advertised for members in a local paper and that was how Maureen Richardson became involved. She was the only person to apply. That was in May last year and since then the trinity has become famous within and well beyond the Teesside boundaries. Both Joyce Beckley and Maureen Richardson are forceful and tireless talkers, and they have the energy and persistence of a terrier after a rat.

Added to these talents, the trinity shares a profound disrespect for authority, and their modest pool of school learning is more than compensated for by a sharp intelligence and a voracious appetite for facts—facts heard on the radio, facts seen on the television, facts read in the newspapers, facts picked up at meetings, in conversations, in buses or anywhere else. On their own ground of pollution the three are more than a match for any industrial tycoon or defensive council official.

One of the trinity's early and well-publicized actions was the picketing of a smelting works with a particularly offensive chimney. Only Mrs. Beckley and Mrs. Conroy sat at the factory gates, hardly a physical threat to either the works or the workers. But they got their picture in the papers, and a lot of publicity (good for them and bad for the foundry) which was substantially increased when the enterprising Maureen Richardson announced her intention of buying herself one share in the company so that she could attend the annual shareholders' meeting in order to raise hell.

There is little doubt that these tactics helped the Chief Public Health Inspector of Teesside to convince his council that the time had come to threaten the foundry company with legal proceedings if a long-demanded, effective filtering system was not fitted to the poisonous chimney without delay. A $260,000 filtering plant has now been purchased and is just about to be installed.

A need for nightly vigils

Joyce Beckley tells the story of the trinity's "burnout" spotting exercise. A burnout is the name given to a flaring, roaring discharge from a factory chimney when some abnormal combustion is going on below. When this happens, the surrounding neighborhood is coated with an unusually rich deposit of grit and ash and soot, and while the burnout is in progress the air stinks. The plant concerned will apologize to the public through the local press, regretting the unfortunate "accident."

"We get a lot of people coming along to give us information," says Joyce. "Workers from the factories. We can't use their names, because they're afraid for their jobs. But they don't mind giving us tips. Well, some of the people at one of the chemical plants told us that the burnouts were done purposely, at night, when they wanted to get rid of something. They're not accidental at all. One night we were told to watch the sky, and we did, and we've never seen a sight like it. There was a massive flame and black soot for miles.

"Well, we decided to keep a regular watch for this happening. One night, at 1:30 in the morning, we were out by the chemical plant at Billingham. There was a really terrible burnout. We couldn't breathe. So we told the story to the press. And immediately the people from the department in the company which is supposed to control pollutants came over to my house. They said they couldn't understand how it had happened. 'And why didn't you tell us? Will you tell us next time?' I said yes but I'll tell it to the press too.

"So by getting it in the papers, and letting them know we were watching, we've blackmailed them into behaving themselves a bit. They don't like the bad publicity, you see. Anyway, they gave me a special number to ring when we wanted to complain. 'Any time of the day, just ring this number,' they said."

Joyce Beckley and her mates roar with laughter as they tell this tale. They love their work.

Last year the trinity organized an essay and poster competition on pollution for local schools. Maureen Richardson rang up 30 schools in one afternoon and 45 the next. She tries to get hold of the quarterly

The trinity plots: Joyce Beckley (left), Doreen Conroy and Maureen Richardson (right).

GARDINERS ISLAND
IV IV
TOUR FOUR * 1972 *
JOURNEY
FOUR CENTURIES
INTO THE PAST
as the personal guest of
Robert David Lion Gardiner,
16th Lord of the Manor of Gardiners Island. Share the legacy of the Island and the Gardiner Family.
Tours of historic Gardiners Island will again be conducted by Southampton College for the benefit of the Scholarship Endowment Fund.
SPECIAL TOURS
Thurs, Fri, Sat, July 27, 28, 29, 1972
10 A.M. to 5 P.M. (Rain or Shine)
Display of Heirlooms
Cocktails — Buffet Luncheon
Subscription: $60 per person
($55 of which is tax deductible)
■ **Mr. Robert D. L. Gardiner will be your Host for cocktails and the buffet.**
■ **Transportation will be provided by Boats leaving from East Hampton, Long Island, and by Buses and Safari Trucks on Gardiners Island.**
FOR RESERVATIONS, Descriptive Brochures, or information—please write to...
The Office for Developmental Affairs
Southampton College
Southampton, New York 11968

Wilderness Expeditions
in association with FRIENDS OF THE EARTH, is arranging 1972 trips accompanied by well known conservationists and scientists to these and other wild places:
Australia's Great Barrier Reef and Queensland Rainforest with **Pixie Loomis** and Australian conservationists **Dr. Frank Talbot** and **Len Webb.**
August 1 - Sept. 3. $1950 including airfare.
Tanzania Marine and Inland Parks with **Gordon Wilson** of African Wildlife Leadership Foundation.
Sept. 18 - Oct. 8. $1450 including airfare.
Kashmir with IUCN ecologist **Colin Holloway.**
Oct. 5 - Nov. 2. $1625 including airfare.
Western Nepal with Conservation Foundation's **Kathy McNamara.**
Oct. 14 - Nov. 17. $1875 including airfare.
MAIL TO:
Wilderness Expeditions, Inc.
Dept. S572, 345 Park Ave., N.Y., N.Y. 10022
(212) 758-1406
Please send your 1972 brochure to:
Name_____
Address_____
City_____ State_____ Zip_____

telephone bill before her husband sees it.

They regularly organize meetings, usually in pubs or somewhere cheap, and they may have a film they have borrowed or some other demonstration as a peg for a discussion. They always invite industry and local officials to these affairs. The local officials rarely turn up, but representatives from the large firms like Shell, Imperial Chemical Industries and British Steel, who want to preserve their public image, invariably do. The smaller firms are less friendly.

The gentlemen from industry are made to sit in the audience. Maureen describes a recent gathering: "They were all sitting there on creaky chairs like little school kids, and we were sitting with them. And you could see them shuffling. It wasn't their usual place. They were used to being up *there,* on the platform, and taking charge. But they still come."

Maureen has a book of press cuttings, and the trinity is becoming familiar on north of England television programs. There is a rapidly growing file of correspondence with Members of Parliament, local officials, local businessmen and Ministers of State. The group also constantly approaches experts in air pollution, or chest diseases, or whatever it may be, for opinions and advice. Very few of the people approached fail to help or reply. All this correspondence, including numerous letters to the press and to local firms, is done in longhand or on a typewriter which they have been given by a sympathetic noble. They must find the money for the paper and envelopes and stamps out of what's left over when they've paid their grocery bills, for the Society has no income.

The annual dinner of the Teesside Clean-Air Society is coming up soon. Maureen said to the others, "Provided the fish isn't too contaminated, let's have fish and chips." So that's what they are going to have, and each guest will bring his own. Perhaps the Society will provide a cup of tea.

"We'll get it in the papers," says Maureen, "and people will say, well, you see, they *are* sincere. They're down to earth. They eat fish and chips like us."

"We can speak our mind"

Joyce Beckley is a little unhappy with Mr. Peter Walker, the British Minister for the Environment. "I've written to him about this place—not only about the pollution, but about the state of the place as a whole, and I've sort of told him off, and asked him exactly what he means to *do* about it. And I'm going to continue to pester him, because he won't *answer.* He passes it over to somebody else, you see.

"So we'll go down there. We're going to plague him. We'll go down to London. We'll make ourselves a nuisance. You've really *got* to do it this way. It's no good just sitting back and writing letters and doing nothing.

"If we don't get a proper answer, we shall suggest that he resign his post and give it to somebody else who can do more about it. He can't do anything to us. I mean, we can speak our mind. We can say what we think."

The Clean Air for Teesside Society meets with a few recent converts.

Book reviews

The House of Life
Paul Brooks
(Houghton Mifflin $8.95)

Paul Brooks here captures Rachel Carson's indomitable spirit and luminous writing. His book contains his favorite pieces of her work, a liberal sprinkling of correspondence she maintained with friends and other scientists and some unpublished observations. One charming sketch deals with phosphorescence in the spring tides of a new moon. She was in Maine at the time and a watcher of the night tides:

"The surf was full of diamonds and emeralds, and was throwing them on the wet sand by the dozen. . . . The individual sparks were so large. . . . I said to Marjie [her niece who grew up in the Carson household] 'Look—one of them has taken to the air!' A firefly was going by, his lamp blinking. We thought nothing special of it, but in a few minutes one of us said, 'There's that firefly again.' The next time he really got a reaction from us, for he was flying so low over the water that his light cast a long surface reflection, like a little headlight. Then the truth dawned on me. He 'thought' the flashes in the water were other fireflies, signalling to him in the age-old manner of fireflies! . . . It was one of those experiences that gives an odd and hard-to-describe feeling with so many overtones beyond the facts themselves."

As her editor at Houghton Mifflin, Brooks worked closely with Miss Carson on two of her books, *Silent Spring* and *The Edge of the Sea*. He came to know her well, to admire her both as a person and an author. In *The House of Life*, written after he resigned his executive duties, Brooks depicts her in many roles, often through her own words. We see her as a young, fun-loving, unflappable and efficient editor at the Fish and Wildlife Service where she wrote "superior government bulletins." After her father died in 1935 she lived with her mother, later raised two nieces, and adopted, when she was nearly 50, a grandnephew. She wrote her first books late at night while still working full time. After her successes, the reader sees her shedding shyness to accept many honors.

Struggling against a long series of illnesses, Miss Carson told her friend Dorothy Freeman in 1962, the year *Silent Spring* was published, "I just creep along, a few hours a day." Never at a loss for ideas, she still thought she'd be wanting to say something if she lived to be 90.

During her last summer in Maine she was aware that she had cancer and would probably not return. On a clear September day she and a friend watched a fall migration of monarch butterflies, and that evening she wrote:

"It occurred to me this afternoon, remembering, that it had been a happy spectacle, that we had felt no sadness when we spoke of the fact that there would be no return. And rightly—for when any living thing has come to the end of its cycle we accept that end as natural. For the monarch butterfly, that cycle is measured in a known span of months. For ourselves, the measure is something else, the span of which we cannot know. But the thought is the same: when that intangible cycle has run its course it is a natural and not unhappy thing that a life comes to its end. . . ."
—Lillian Moore
Author of SMITHSONIAN article, July 1970, on Rachel Carson

The Romantic Challenge
Sir Francis Chichester
(Coward, McCann & Geoghegan, $7.95)

Sir Francis Chichester's latest lonely adventure was an attempt to sail 4,000 miles in 20 days, simply because no one had ever done it before. Large sailboats may make daily runs of 200 miles, but there are tremendous difficulties in maintaining speed when sailing single-handed. Even though your vessel is controlled by a steer-

worshipped, eaten, dreaded, exploited

the 140,000,000-year-story of a now-endangered link with mesozoic times

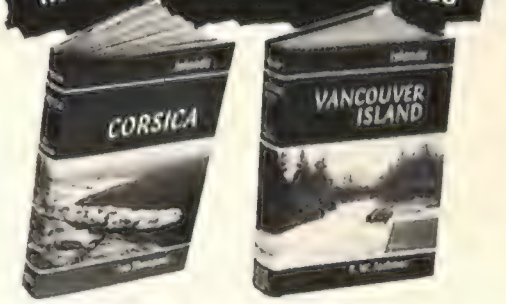
C. A. W. GUGGISBERG
provides the long-needed report on

CROCODILES:
Their Natural History, Folklore and Conservation

This distinguished naturalist offers a full, accurate account of the life and habits of these adaptable cousins of the dinosaurs—physical characteristics detailed and pictured for each species; their daily life, feeding, hunting, mating, breeding described; their place in the world's ecology, history, legends, religion, and literature recounted. And, before they're all hand-bagged, a program to "save the Croc" in America and worldwide. Royalties shared by World Wildlife Fund. 224 pages, with photographs, drawings, maps. $7.95

Stackpole Books

explore the lore and life of the ISLANDS OF THE WORLD in these first in a new series



Portrait-style biographies and basic references, capturing the feel and facts of ancient and current cultures PLUS history, geology, economy, politics, attractions.

CORSICA
Ian Thompson paints the complete, poetic to banal picture of this rugged "scented isle" of vendetta fame—its troubled history, way of life, towns, varied terrain, problems, beauty. 212 pages, illustrated. $7.95

VANCOUVER ISLAND
S. W. Jackman offers a travel-whetting overview of this island with sophisticated Victoria but with no public road to drive its length. Concise on social history, infinite tourist appeal, natural features, economy today. 208 pages, illustrated. $7.95

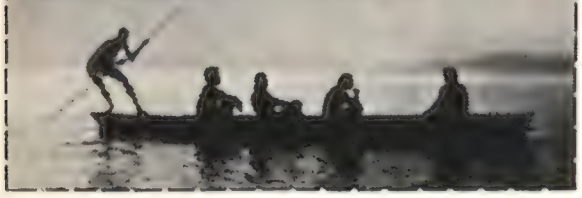
Please send 555 this Smithsonian subscriber:
____ cop of **CROCODILES**
____ cop of **CORSICA**
____ cop of **VANCOUVER ISLAND**
☐ Check enclosed.
☐ Bill me, plus $1.00 postage-handling
Name_____
Address_____
City_____ State_____ Zip_____

Stackpole Books
Cameron & Kelker Sts. Harrisburg, Pa. 17105

FREE! Our South Pacific adventure kits.

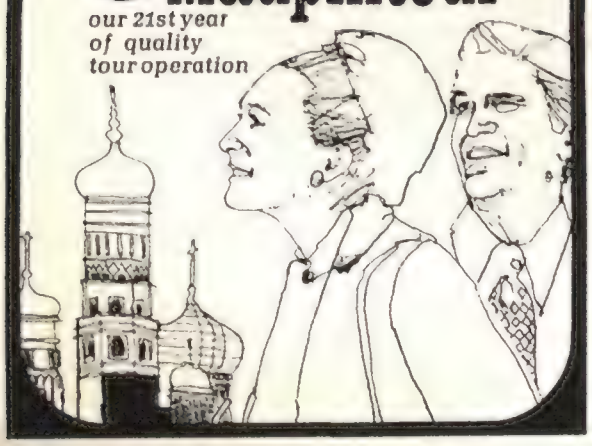
Full color tour folders on our South Pacific, New Zealand, Australia. What to see, where to stay, how to dress, where to shop.
BONUS! Order now, get $1.95 Sunset Travel Books at a discount. 80-page guide to New Zealand or 95-page guide to Australia—just $1 each.

AIR NEW ZEALAND SM-5-72
Box 4187, North Hollywood, CA 91607
Send me your free
South Pacific Adventure Kit.
Name
Address
City State/Zip
I enclose $1 each for Sunset book on
☐ New Zealand ☐ Australia



JOIN
WEST INDIES CRUISE
Congenial group now forming. Schooner sailing for remote Caribbean Isles, Grenadines, Antigua, Saba, etc. 10 days-$250. Cap'n Mike, P.O. Box 120, Dept. 15 Miami Beach, Florida 33139

MAUPINTOUR
THE UNHURRIED HOLIDAYS
USSR
EASTERN EUROPE
CHOICE of 17 adventure tours, fully all-inclusive and escorted, feature Russia and/or one or several Eastern Europe countries, Siberia, Central Asia, Samarkand or Balkans, Dalmatia or add Scandinavia. Also the Berlins, Middle Europe. From 15 days to a Grand 68 days.
ASK YOUR TRAVEL AGENT for Maupintour's detailed 52-page EASTERN EUROPE brochure or write Maupintour, 900 Massachusetts St., Lawrence, Kansas 66044. Telephone 913/843-1211.
Maupintour
our 21st year of quality tour operation



ing vane, you face a vast amount of work, including the everlasting problem of fighting exhaustion.

Sir Francis has shown us his stamina and courage by flying solo across the Tasman Sea in 1931, winning the transatlantic single-handed race in 1960 and circling the globe in *Gipsy Moth IV* in 1967. To me, his attitude comes across better in *The Romantic Challenge* than in the other books he has written about his exploits. This time, when sailing for speed, he writes a little slower.

In *Gipsy Moth Circles the World,* Chichester carried a chip on his shoulder. In detailing every minute of life aboard, he showed himself constantly at odds with

Gipsy Moth V at nine-and-a-half knots.

the designer, the builder, the yacht herself. I always thought him unfair to criticize so heavily a vessel that had done so much for him. This time, writing more philosophically, he seems to realize that boats, like men, are not perfect. He describes what he and his vessel can accomplish together, not just his own lonely struggles, carried on *despite* the vessel.

To sail 4,000 miles in 20 days doesn't prove a thing. Yet how many men of 69 years do we know who would single-handedly sail a 57-foot boat across the Atlantic, navigate the dangerous Caribbean passages, approach an unmarked foreign shore at night, stay a week, then beat back through those same coral passes? Day and night, calm or storm, he kept at it so that in his words, "I could feel free as a bird." And battling home, he endured a full gale that nearly cost him his boat and his life. How many such men of 20 do we know?

—Richard Zantzinger
Author of a coming book on his own round-the-world passage

Love and Hate
Irenäus Eibl-Eibesfeldt
(Holt, Rinehart and Winston, $7.95)

This introduction to human behavior patterns is written by a zoologist. He departs from the current popularization of Man as an aggressive creature, and instead concentrates on the behavioral mechanisms that help Mankind form bonds and "cement" groups together. Although the author draws heavily on studies of animal behavior, he also draws upon his own field data gathered from a study of diverse human communities.

The author makes a case for the inherent tendencies in Man by discussing the development of facial expressions and body postures which can serve to communicate mood and intent. These forms of nonverbal communication may be treated the same way that display patterns have been treated in animals. And one can begin to reconstruct the evolutionary processes by which nonverbal gestures for communication can evolve.

Aggressive behavior has the value of promoting and preserving group integrity. Aggression tends to become ritualized in animals and men and is rarely expressed in an unrestrained fashion. Social bonding mechanisms serve as constraints to aggressive behavior. The author discusses these, including the drive to bond and the various types of bonding shown by animals and men. Man's initial courtship appears to involve behavior patterns that spring from the interaction between mothers and infants. (In this interpretation the author departs radically from Freud.)

This book casts the behavior of Man into a balanced perspective. Here is an important presentation, well illustrated and entertaining to the lay reader.

—John F. Eisenberg
Resident Scientist
National Zoological Park

Black Company
Eric Purdon
(Luce, $6.95)

Eric Purdon was the first commanding officer of the first vessel in the United

If you're growing tired of being "such a good listener"...

Of course, it would be a lot more fun to be a "great conversationalist" instead. But how would you go about it? How could you become the kind of fascinating person you usually admire — full of ideas, information, with an air of enviable authority on half a dozen subjects . . .

If you had all the time in the world, you could plow through dozens and dozens of magazines and books every month. But if your time is limited, you can let the editors of *Intellectual Digest* do all that heavy reading and sifting for you. And bring you the best of the lot — the not-to-be-missed discussable articles that really interest you.

Intellectual Digest gives you the opportunity to sample the most fascinating magazines published today — from the well-known quality magazines such as *The New Yorker, Foreign Affairs* and *Commentary* . . . to professional magazines (usually unavailable to the layman) such as *Physics Today, Annals of Internal Medicine,* and *The New Scientist* . . . to the "little magazines" and literary quarterlies such as *Paris Review, Daedalus,* and *Antioch Review.* Over 300 magazines in all.

You'll be absorbing facts, theories, discoveries, revelations, even backstage rumors, about everything important on the current scene . . . in science, literature, sociology, art, medicine, history, politics. Most articles are published in full — but when space considerations make cuts necessary, it's always with the approval and collaboration of the author.

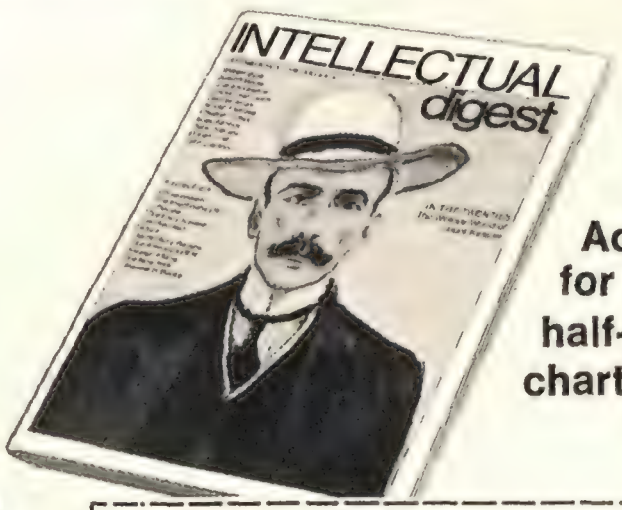
In addition, at least six excerpts from major books are in every issue—often brought to you before publication. Recent examples: John Gardner's *Grendel, The "Diary" of Van Gogh,* Kate Millett's *Sexual Politics,* Julian Huxley's *Memories,* and R. D. Laing's *Knots.* And newsletters in every issue keep you abreast of the latest developments in the arts and sciences.

Act now for the half-price Charter offer

Doesn't this sound like the kind of magazine that could make even talking to *yourself* more interesting? Why not take advantage of the special $5 Charter Rate while it's still in effect. Just mail the coupon and after your first issue arrives, decide for yourself if you wish to continue. In any case, the first issue is yours to keep with our compliments.

Why shouldn't you be the one to bring fascinating subjects like these into the conversation?

- **Gore Vidal attacks the fallacy of the male imperative and asks why the male ego can't accept the female challenge to its dominance.** *(N. Y. Review of Books)*
- **A geologist discovers that the South Pole was once in the Sahara Desert.** *(Natural History)*
- **Was Ho Chi Minh a bad poet? Read the arguments, pro and con, and decide for yourself as Intellectual Digest presents the Chinese original and two clashing translations.**
- **"Is Religion Superfluous?". . . noted British historian Arnold Toynbee tells why science cannot solve human insecurity, fear of failure and death.** (Excerpt from *Surviving the Future*)
- **"The Liberal Schism". . . a venomous ideological confrontation among warring factions of New York's literary-political fraternity.** *(Commonweal)*



Act now for special half-price charter rate

INTELLECTUAL DIGEST
P.O. Box 2986
Boulder, Colorado 80302

Please send my complimentary issue and enter my charter half-price subscription for 11 additional issues at only $5 (a total savings of 50% on the regular $10 price). I may cancel within 14 days after receiving it if not fully satisfied.

☐ **Bill me** ☐ **$5 enclosed**

Name.....

Address.....

City.....

State.....Zip.....

Add 50¢ for Canada and $2 for Foreign. 6355

"Key Of Life"
Jewelry
Ancient Egyptian hieroglyph called "ANKH" meaning "LIFE", beautifully crafted 2½" pendant in Solid 18K. or 14K. Gold & Sterling Silver. Worn today by men and women of all faiths as a symbol of...
LOVE and LIFE!
Perfect gift expressing long life and happiness!
ANKH—on 24" chain, jewelry box & certificate...
ACTUAL SIZE
Solid Sterling Silver $27.95
Solid 14 Karat Gold 79.95
Solid 18 Karat Gold 100.95
Museum & Dealer inquiries invited
FREE GIFT CATALOG
Ancient world art & jewelry—unique gifts for all interests! Outside U.S.A. please send $1.
• Order shipped promptly • Money back guarantee.
aladdin house, ltd.
Dept. S-572 • 648 Ninth Ave. • N.Y. 10036
Genuine Artifacts and Antiquities
Unusual Gifts from Ancient Worlds

Like the Saragoy, we have sturdy, well-built pouches . . . *except ours fit on your back.* We manufacture backpacking and mountaineering equipment . . . our color catalog is 25 cents.

SIERRA DESIGNS, Dept. SM-1
4th and Addison Sts., Berkeley, CA 94710

LIMITED EDITION
Collector's print, 24" x 29".
4,000 signed—$60.00 each.
1,000 signed *and* numbered—$75.00 each.
(Plus $1.00 ea. post. & ins.
Ill. residents add 5% tax)

Trein's

Dept. SM, 201 W. 1st, Dixon, Illinois 61021. Phone: (815) 284-6626

Very choice! From Midwest's largest selection of Limited Editions. Established 1883

States Navy since World War I in which Negroes served as anything besides mess attendants. While Purdon's sincerity cannot be doubted, his text reads like a hurriedly written public relations release.

Having carped about the style, it is a pleasure to praise the subject matter. In these days, when many of us take racial integration for granted, it is discomforting to be reminded that until 1944, in the midst of a war fought against the concepts of "master race," the U.S. Navy refused to rate Negroes as anything but stewards. *Black Company* is the story of the Navy's initial experiment, not in true integration, but in employing aboard one ship as many enlisted blacks as possible in as many ratings as possible, including motor machinists, signalmen, gunners and electronic technicians.

The experiment aboard PC 1264, a 500-ton subchaser, began with white officers and petty officers, but ended not only with black petty officers but with one black ensign, Samuel L. Gravely jr., now a rear admiral.

The PC 1264 experiment was launched in April 1944, with 58 enlisted men, 50 of whom were black, and five white officers crowded aboard a 173-foot vessel, too small even to have a name. Within seven months, the eight white petty officers had done their work so successfully that they were replaced by eight black petty officers promoted from the crew. When PC 1264 was decommissioned 15 months later, the experiment had proved successful enough for many of the black crewmen to have been transferred to other naval units, thus beginning true integration.

Purdon obviously liked and respected his black crew. Perhaps because of this, the reader gets to know many of them well enough to forget that they are black. It is jolting to be reminded by an unpleasant incident at the racially segregated public beaches in Miami, where the subchaser crews were trained.

When World War II broke out, not a single Negro was qualified for general service in the U.S. Navy. Between 1919 and 1932, no Negroes were even recruited for the Navy. By the end of the war, thanks largely to PC 1264 and her able crew, and to Lieutenant Christopher Smith Sargent, a dedicated young officer in the Bureau of Naval Personnel, blacks started to gain acceptance at sea.

—*Thomas French Norton*

Writer-editor and former naval officer

Picture Credits

Cover National Collection of Fine Arts; 12 *Transat Actualites;* 17 Richard Swanson; 18-23 U. S. Forest Service; 25, 26, 27, left Terence Spencer; 27 George E. Watson; 28, 29 George Holton-Lindblad; 30 Terence Spencer; 31 George Holton-Lindblad; 32-35 Stan Wayman; 36, 37 National Collection of Fine Arts; 39 The Hon. Claiborne Pell, Amon Carter Museum, Fort Worth; 40 Museum of Fine Arts, Boston; 41 Kennedy Galleries, Inc.; 43 Amon Carter Museum, Fort Worth; 46 Fritz Goro; 47 Nina Oparin; 48, 49 Fritz Goro; 50 NASA-Ames Institute; 51 Elso S. Barghoorn; 52 © by the California Institute of Technology and the Carnegie Institution of Washington; 53 NASA-Ames Institute; 54-57 Gary Grimm; 58, 59 The Whaling Museum, New Bedford, Mass.; 60 © Rockwell Kent Estate; 61 Harper's; 62 63 Cooper Collection; 64 The Atlantic Companies; 65 Stan Wayman; 66-73 Ian Yeomans; 74, 77, 78 Terence Spencer; 80 Coward, McCann & Geoghegan, Inc.; 88 James Flora.

How's Your Hearing?

Chicago, Ill.—A free offer of special interest to those who hear but do not understand words has been announced by Beltone. A non-operating model of the smallest Beltone aid ever made will be given absolutely free to anyone answering this advertisement.

Try it to see how it is worn in the privacy of your own home without cost or obligation of any kind. It's yours to keep, free. It weighs less than a third of an ounce, and it's all at ear level, in one unit. No wires lead from body to head.

These models are free, so we suggest you write for yours now. Again, we repeat, there is no cost, and certainly no obligation. Write to Dept. 4023, Beltone Electronics Corp., 4201 W. Victoria, Chicago, Ill. 60646.

SMITHSONIANS
kept
Neat, Clean, Handy

Magazines slip into these handsome files to become valuable reference volumes; to look like fine books on your library shelves. Leather-like, dark blue fronts are beautifully embossed in gold. Easily applied gold numbers are included for adding dates and volumes. One file holds one year (12 copies) of Smithsonian. Satisfaction guaranteed. Send check to:

THE HIGHSMITH CO., INC.
Box 25s
Fort Atkinson, Wis. 53538

One Smithsonian File, $2.50
3 for $5.95. All postpaid.

The Smithsonian Institution in affiliation with Educational Expeditions International is pleased to offer a challenging new series of educational adventures to Smithsonian Associates.

The 1971 season of co-sponsored expeditions proved so successful that once again Smithsonian Associates are being invited to join distinguished scientists on field research expeditions in archaeology, anthropology, geology, ecology and astronomy.

No special qualifications are necessary. Our expeditions are designed to offer small groups of enthusiastic and responsible non-specialists the opportunity to support, both physically and financially, significant scientific field research.

Each expedition has a definite purpose and objective. Each attempts to solve a specific research problem posed by an eminent scientist who has had extensive experience conducting field research in his area of specialization. Under his personal instruction and supervision team members participate actively in actual field research.

If you are the sort of person who finds his rewards in the personal satisfaction that comes from meaningful accomplishment, we will welcome your application for participation in our 1972 expeditions.

Charges to participants cover ground transportation, accommodations, including bivouac facilities in the field, meals, and logistic support.

Participation in each expedition is limited, and early registration is essential. For an expedition brochure and a registration application, write:

eei
EXPEDITIONS
Smithsonian Associates Reception Center
Great Hall
Smithsonian Building
Washington, D.C. 20560

☐ **Kenya Lakes** A 21-day ecological and geological field study of the Rift Valley lakes in Kenya, East Africa. Chief Scientist: Dr. Igor Loupekine, Chairman, Department of Geology, University of Nairobi, Kenya, East Africa. Cost $1430*/20 June-11 July

☐ **Ubeidiya** A 21-day archaeological excavation of a Middle Stone Age site near Tiberius, Israel. Chief Scientist: Dr. Ofer Bar-Yosef, Hebrew University, Israel. Cost $1275*/23 June-14 July

☐ **Ancient Gythion** An underwater archaeology expedition to survey the sunken town of ancient Gythion, the harbor of Sparta, in the Gulf of Laconia, Greece. Chief Scientist: Niki Scoufopoulos, Classics Department, Tufts University, and Director, Aegean Institute, Poros, Greece. Cost $1175*/8-29 August or 9-week program: Cost $1675*/26 June-29 August

☐ **Solar Eclipse: Canada** A 7-day astronomical observation, coronal photography, and systematic intra-Mercurial object search during a total eclipse of the sun at Prince Edward Island, Canada. Chief Scientist: Dr. Donald H. Menzel, Past Director, Harvard College Observatory. Cost $400*/5-11 July

☐ **Negev** A 21-day ecological study of an archaeological site in the western Negev, Israel. Chief Scientist: David Price Williams, Institute of Archaeology, University of London. Cost $1275*/9-29 July

☐ **Boseti Gouda** A 21-day geological study of a dormant volcano in the Rift Valley of Ethiopia. Chief Scientist: Dr. Ian Gibson, Department of Geology, University of London. Cost $1360*/10-30 July

☐ **Okavango** A 21-day anthropological and ecological study of the Hambukushu people of the Okavango River area of Botswana, south-central Africa. Chief Scientist: Thomas Larson, Northern Virginia Community College. Cost $1460*/1-20 August

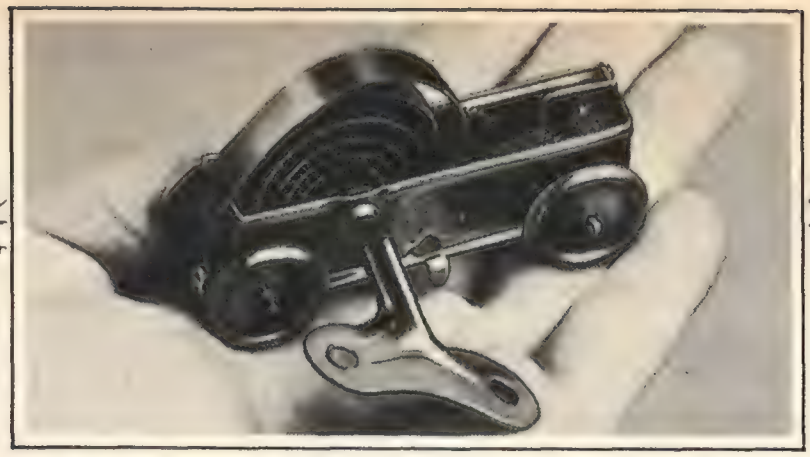
☐ **Bermuda** A 21-day marine archaeological excavation of a 16th century Spanish galleon off the coast of Bermuda. Scuba certificate required. Chief Scientist: Dr. Mendel Peterson, Underwater Exploration Project, Smithsonian Institution. Cost $1275*/1-21 August

☐ **Nyragongo** A 21-day field expedition to study the active lava lake of the Nyragongo volcano in the eastern Congo, Central Africa. Chief Scientist: Dr. Haroun Tazieff, Chief of Volcanological Research, CNRS, Paris. Cost $2056*/1-21 August

☐ **Meroe** A 21-day archaeological excavation of the Upper Egyptian city of Meroe in the Sudan. Chief Scientist: Dr. Peter Shinnie, Department of Archaeology, Universities of Calgary (Canada) and Khartoum (Sudan). Cost $1430*/15 December 1972-4 January 1973

☐ **Solar Eclipse: Mauritania** A 21-day astronomical expedition to observe and record the longest total solar eclipse of the 20th century from Mauritania, in the western Sahara Desert. Chief Scientist: Dr. Donald H. Menzel, Past Director, Harvard College Observatory. Cost $1490*/13 June-3 July 1973

*Plus Airfare



The Classic Mechanical Toy

WITH POWERFUL CLOCKWORK MOTOR

own an entire fleet of 6 for only $5.95

Remember the good old days when they really knew how to make mechanical toys? They made them out of heavy, stamped metal, not plastic. The toys had powerful wind-up motors and lots of whirring, clicking reduction gears that seemed to keep running forever. We used to take the toys apart because the motors were really the most fascinating part.

Well, after lots of looking, we managed to find a group of highly skilled, dedicated craftsmen overseas who were able to duplicate exactly the top quality, spring-driven classic toy car motors that were precision-made almost a quarter-century ago by gifted German toy masters. These toy motors have virtually unbreakable blue carbon steel springs that we personally clocked at 3½-minutes running time (that's a long time); they have 8 separate metal cogwheel gears (cheap toys have only 2); there's a unique cut-off device that automatically stops the motor when the car overturns or bumps into something (it starts automatically again when the car is righted); the chassis and wheels are heavy stamped metal; and there's superb workmanship throughout.

They're fascinating. They scoot all over the place with gears whirring and clicking. You can race them. Build things. They provide hours of educational fun for the kids. Hobbyists love them. They're marvelous for relieving executive tensions. They just don't make 'em like this anymore. And you can now buy an entire fleet of 6 for less than you'd expect to pay for a single plastic toy nowadays.

Order No. 40700: Set of 6 CLASSIC MECHANICAL CARS (Complete with jumbo wind-up keys) only $5.95 (plus 60¢ postage). Send check or money order.

(N.Y. residents add sales tax.)

FREE gift catalog on request.

THE EVERYTHING GUARANTEE:

The GALLERY guarantees EVERYTHING: The quality, accuracy of description, availability, prompt delivery. If not delighted, return the cars **within 3 weeks after you receive them** (not the usual 10 days) for an instant refund of purchase price or cancellation of charges.

finer things by mail from The GALLERY Dept. 4258, Amsterdam, N.Y. 12010

LIVE IN THE WORLD OF TOMORROW . . . TODAY!

UNUSUAL BARGAINS

NEW PRODUCTS • NEW MATERIALS • NEW IDEAS

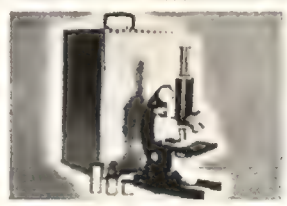
SCIENCE OPTICS ELECTRONICS

NEW $99.50 HELIUM-NEON LASER!

Completely assembled, instant-starting w/3X power output of comparable models. Steady, ripple-free light of moderate (safe) power. Excellent collimation. Simple and safe to use. 4½ lb. unit reaches 75% power in 2 secs.; 100%, typically 0.5 milliwatt (0.3 mW minimum) in 3 mins. Beam divergence 2 milliradians—2 cms at 40 ft.

Stock No. 79,004KS ..... $99.50 Ppd.

25X to 900X LABORATORY MICROSCOPE

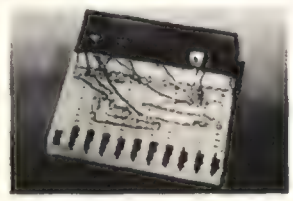


Sturdy, monocular-type. 3 Coated Achromatic parfocal objectives—5X (0.10 NA), 10X (0.25 NA), 60X (0.85 NA); triple revolving nosepiece. Automatic focusing stop prevents damage to objectives and slides. Fixed 160mm tube. Rack & pinion coarse focusing & fine micrometer type slide adjustments. 3 Huygenian eyepieces: 5X, 10X, 15X. Bakelite stage 4½" x 4-5/16", 2 stage clips accept Edmund graduated mech. stage No. 30,060—Substage equipment: Fixed-condenser lens, iris diaphragm, 1⅞" diam. plano-concave mirror.
Stock No. 85,049KS..(11¾" H., 11 lbs. W)..$110.75 F.O.B.

DECIDE THE SEX OF YOUR BABY

Pre-determining sex can't be guaranteed 100%, but now there's a way to do it with 80% clinically substantiated reliability! New Sex Determination Kit includes fertility testor, fertility tape and "Your Baby's Sex: Now You Can Choose", by Dr. Landrum B. Shettles, famous for discovery and identification of male & female producing sperms. Method explained in his book based on natural cycles, no manipulation of nature. Especially helpful also in achieving or postponing pregnancy. Complete instructions.
No. 60,905KS (SEX DETERMINATION KIT).... $8.25 Ppd.

N E W ! ELECTRONIC DIGITAL COMPUTER KIT!



Solve problems, play games, predict weather with this actual working model of giant electronic brains. Amazing new fun way to learn all about computer programming . . . logic, decimal, binary systems. Laws of Sets—even do your own programming after completing simplified 116 page instructive booklet. Includes step-by-step assembly diagrams. Circuits easily changed. Readout from illuminated control panel. Req. 2 "D" batt. (not incl.). Best model we've seen—for home, school, industry.
No. 71,434KS .... (11"X12½"X4") ..... $31.50 Ppd.

MAIL COUPON FOR GIANT FREE CATALOG

148 PAGES • MORE THAN 4000 UNUSUAL BARGAINS

Completely new Catalog. Packed with huge selection of telescopes, microscopes, binoculars, magnets, magnifiers, prisms, photo components, ecology and Unique Lighting items, parts, kits, accessories—many hard-to-get surplus bargains. 100's of charts, illustrations. For hobbyists, experimenters, schools, industry.

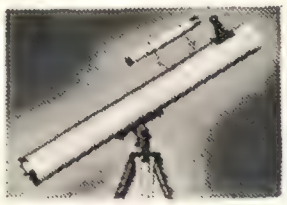
EDMUND SCIENTIFIC CO.
300 Edscorp Building, Barrington, N.J. 08007
Please rush Free Giant Catalog "KS"

Name .....

Address .....

City ..... State ..... Zip.....

3" ASTRONOMICAL TELESCOPE



See moon shots, orbits-stars, phases of Venus, planets close up. 60 to 180 power. New improved, aluminized and overcoated 3" diameter f/10 primary mirror, ventilated cell. Equatorial mount with locks on both axes. Equipped with 60x finder telescope, hardwood tripod. Included FREE: "STAR CHART"; 272 page "HANDBOOK OF HEAVENS"; "HOW TO USE YOUR TELESCOPE" book.
Stock No. 85,050KS ..... $32.95 Ppd.

DELUXE 3" ASTRONOMICAL REFLECTOR TELESCOPE
Stock No. 80,162KS ..... $59.50 Ppd.

4¼" REFLECTOR TELESCOPE
Stock No. 85,105KS ..... $94.05 FOB

6" REFLECTOR TELESCOPE
Stock No. 85,086KS ..... $239.00 FOB

EDMUND SCIENTIFIC CO.
300 EDSCORP BLDG. BARRINGTON, NEW JERSEY 08007
ORDER BY STOCK NUMBER • SEND CHECK OR MONEY ORDER • MONEY-BACK GUARANTEE

Smithsonian highlights

New summer hours now in effect are: 10 A.M. to 9 P.M. for A & I, MNH and MHT. Hours for the other buildings remain the usual 10 A.M. to 5:30 P.M.

Arts and Industries Building

"Drugs" is a general perspective of all aspects of drug use in our society. Opening May 13, the show will include films, lectures, panel discussions and theater.

"World War I Fighters," a habitat exhibit, shows a front-line forward airstrip in a reenactment of the capture of a Fokker D-VII. Also included are memorabilia of the period with uniforms, medals and a commemorative exhibit on the Lafayette Escadrille.

"Balloons" tells the total story of ballooning from its invention to its future possibilities—showing forms, fabrics and functions (see pp. 32-35).

Museum of Natural History

"Art of Simon Yavitz" features 19 sculptures made of plant materials cast in gold and set on mineral bases.

Museum of History and Technology

"Beekeeping" is an observational glass beehive from which the bees can leave through a hole in the wall to gather pollen around downtown Washington and return to hive life each day.

Freer Gallery of Art

"2,500 Years of Persian Art" celebrates the anniversary of the founding of Iran with an exhibit of jewelry, ceramics, miniatures and examples of calligraphy and illumination (see April SMITHSONIAN).

Renwick Gallery
"Jack Lenor Larsen Retrospective" will show 75 pieces of fabric by the innovative contemporary weaver, through May 31.

"Woodenworks" is a display of furniture by five contemporary wood craftsmen.

"Pueblo Pottery," Zuñi and Acoma designs from the Smithsonian collection, includes 50 bowls, pots, ladles and effigies made by 19-century master potters of New Mexico.

"Design Is . . ." includes such diverse objects as a heart pacemaker and a modern fireplug to show elements of design.

National Portrait Gallery
"If Elected . . ." focuses on portraits of men and women who ran for the Presidency and were defeated. The show deals with unsuccessful candidates from 1796 to 1968, including campaign memorabilia, and opens May 3.

National Collection of Fine Arts
"Children's Day" is a day of activities for children aged 6-12 on May 13. It will include tours, crafts, musicians, a Punch and Judy show and artists at work. For information, call (202) 381-6306.

"Two American Painters: Fritz Scholder and T. C. Cannon" will exhibit through May 29 some 30 paintings by these two contemporary Indian artists—the former combining Pop and protest, the latter reflecting a more traditional view.

Special Events
"Changing Political Technology" is the subject of a seminar presented by the Woodrow Wilson International Center for Scholars on May 18 at 8 P.M. as part of their overall study of the "Dynamics of the American Political System."

Division of Performing Arts
"Land of Oz," written especially for the Smithsonian Puppet Theater, is performed twice daily, Wednesday through Friday, and three times daily on weekends. Call (202) 381-5395.

Smithsonian Commons
Luncheon facilities for members of the Smithsonian Associates are located in the original Smithsonian Building. Open weekdays from 11:30 A.M. to 2:00 P.M.,

When I go into an area and cut down all the trees, some people don't understand why. They want to know why I have to cut *all* the trees, why I have to take something so beautiful and leave something so ugly in its place.

What many people don't know is that I'm clearcutting to *save* the forest—the same way Nature does.

These trees are Douglas Fir. Here in western Oregon, their seedlings are only going to grow out in the open, where they can get plenty of sunlight, so if I don't clearcut, Nature will—with winds or disastrous forest fires that burn out thousands of acres. That's been Nature's way for 10,000 years, but I can do the same thing by planned harvesting and regeneration—and the trees I clearcut can be used instead of going up in smoke.

I've logged areas, burned the slash, replanted, and watched beautiful new forests come back, so I *know* what we're doing is right. And I wish more people understood the reasons behind what they saw before they cried "forest raper." Because then I think they'd see the promise of continuing forests for their children and grandchildren in those clearcuts. The way we see it. The way we plan it.

Dave Burwell

Dave Burwell, Forester
Rosboro Lumber Company
Oregon

Are we running out of forests? You'll find the answers in "Forests USA," a full-color, 16-page booklet. For your copy send 25¢ to AFI, 1619 Mass. Ave., N.W., Washington, D.C. 20036.

Name

Address

City

State Zip

American Forest Institute S2

Responsible forest management to keep America green.

Tours for Associates

Study tours are designed as educational travel for members of the Smithsonian Associates. Smithsonian staff or other experts accompany all tours. For information, see below.

Foreign Study Tours

For information: Miss Bliss Schumann, Room 123 SI, Smithsonian Institution, Washington, D.C. 20560.

"No Tour" Tour: Dulles International Airport to Paris and return—May 29-June 19. Members make their own arrangements and pay for their own travel in Europe.

Greece and Yugoslavia: A classical tour of Greek archaeological sites with a visit to Yugoslavia's Adriatic coast and inland sites—June 12-July 10.

King Arthur's England: Roman Britain (including Bath), ending with London —July 11-August 1.

"No Tour" Tour: New York to Amsterdam and return—July 17-August 7. Members make their own arrangements for travel in Europe.

"No Tour" Tour: Dulles International Airport to London and return—September 11-October 2. Members make their own arrangements for travel in Europe.

The Pilgrimage Road: The route of medieval pilgrims from Paris through Burgundy and Bordeaux to the shrine of Santiago de Compostela in northern Spain—September 11-October 9.

Russian Museum Tour: A tour to include Moscow, Leningrad, Kiev, Georgia, along with two nights each in Poland and Finland—September 12-October 3.

Pakistan and Afghanistan: A tour to include the archaeological sites of Mohenjodaro and Taxla and the state of Swat in Pakistan; the districts of Hunza and Gilgit in Kashmir; and through the Khyber Pass to Bamiyan and other remote Afghanistanian areas—October 9-November 8.

Domestic Study Tours

For information: Mrs. Patricia Kilkenny, Room 118 SI, Smithsonian Institution, Washington, D.C. 20560.

Northern Pueblo Indians: Five-day tours in the pueblo region of northern New Mexico—June departures.

Navaho Land, Arizona, New Mexico and Utah: Tours created by the Navaho tribe covering the history and natural wonders of their 25,000-square-mile nation—June departures.

Windjammer Cruise: Six days of schooner sailing off the coast of Maine—June 25-July 1.

Solar Eclipse: A working trip to view the solar phenomenon from Prince Edward Island, Canada—July 5-11.

Archaeology Dig: A week's participation on a work dig in New Hampshire —August 6-12.

Arizona Astronomy Weekend: A unique opportunity to view the Smithsonian's Mt. Hopkins Observatory and other research facilities in the area—October 6-9.

the Commons offers a buffet luncheon from $1.40 to $1.85 upon presentation of a membership card.

Traveling Exhibition Service

There are up to 70 different Smithsonian-sponsored exhibitions on display each month throughout the United States and Canada. For a complete listing and information on how to bring an exhibit to your area write: Traveling Exhibition Service, Smithsonian Institution, Washington, D.C. 20560.

- Dover, Delaware—"Contemporary African Printmakers" (Martin Luther King Student Center, Delaware State College, through May 28).

- Quincy, Illinois — "Contemporary American Drawings V (Quincy College, May 6-June 4).

- Riverside, California—"The Historic Architecture and Urban Design of Nantucket" (University of California Gallery, May 13-June 11).

- Newark, Delaware—"U.S. World War I Posters" (University of Delaware, May-13-June 11).

- Moscow, Idaho—"Lalibela" (University of Idaho, May 6-June 4).

- Gettysburg, Pennsylvania—"The Frederick Douglass Years I" (Gettysburg College, through May 28).

- Midland, Texas—"Greenland: Arctic Denmark" (Museum of the Southeast, through May 27).

- San Diego, California—"Vision of Peace in Painting" (Jewish Community Center, May 13-June 11).

- Sandusky, Ohio—"Paintings by Children of Many Lands" (Sandusky Area Cultural Center, May 13-June 11).

- Minneapolis, Minnesota — "Indian Images II" (Minneapolis Institute of Arts, May 13-June 11).

- Colorado Springs, Colorado—"Hand of Man on America" (The Taylor Museum, Colorado Springs Fine Arts Center, through May 21).

Take advantage of your Associateship!

Buy these Smithsonian staff-selected books at reduced prices.

1. THE GLASS OF FREDERICK CARDER
by Paul V. Gardner
Introduction by Paul N. Perrot

The distinguished founder of the Steuben Glass Works is further immortalized in this beautiful book, the definitive view of his life's work. More than 400 photographs, 80 in full color, *plus* 7,000 line drawings review all the special types of glass for which Carder was so justly famed. The author, Curator of Ceramics and Glass at the Smithsonian, former Carder associate and long time friend, is uniquely qualified to tell the story. $20.00 Associate's price **$17.95**

2. AMERICAN ARCHITECTURE SINCE 1780
A Guide to the Styles
by Marcus Whiffen

This compact guide, intended to aid those who admire unusual old houses and public buildings, reviews the exterior characteristics of various style structures from the revolution to the present day. "It is by far the best single work explaining by text and photos the various styles since 1780 of American Architecture." JAMES GOOD, *Curator, Smithsonian Institution Building.* $7.95 Associate's price **$6.95**

3. AMERICAN INDIAN PORTRAITS
from the Wanamaker Expedition of 1913
Edited by Charles R. Reynolds, Jr.

Unforgettably moving! Absolutely splendid, old photographs of Indians—men, women and children—of various tribes across the country. The collection—120 in all—only recently brought to light, comes close, says *Life,* to "capturing the Indians' souls." "I find myself deeply affected by the superb photographs from out of the past." MARVIN SADIK, *Director of National Portrait Gallery.*
$12.50 Associate's price **$10.95**

4. LOST AMERICA: From the Atlantic to the Mississippi
Edited by Constance M. Greiff
with a Foreword by James Biddle

For architecture buffs and social historians—a unique and dramatic pictorial record of a vanished cultural heritage. Here are 250 landmark structures that have been destroyed in the name of progress. "We have lost," writes the editor, "or at best gravely diminished, the variety and excitement that characterized much of American culture." An important call for preservation to be followed by a second volume on the area west of the Mississippi.
$17.95 Associate's price **$15.95**

5. THE AGE OF MAMMALS by Björn Kurtén

Magnificently researched, handsomely illustrated, this unusual book presents the geography, flora and fauna of the earth during the last 65 million years of geological time—the Cenozoic era. The author, lecturer in Palaeontology at the University of Helsinki, gives special attention to the multitude and diversity of mammals that have flourished during the Cenozoic period through the age of man.
$9.95 Associate's price **$8.95**

6. AMERICAN SILVER: A History of Style, 1650-1900
by Graham Hood

The Director of Collections at Colonial Williamsburg provides a stunning, authoritative survey for the general reader and the collector. He traces the entire history of style in American silver from lovely, simple seventeenth-century cups and beakers to the handsome, varied products of the nineteenth century. Masterpieces of each period are discussed in detail. No other book on the subject is so generously illustrated. $15.00 Associate's price **$13.50**

7. LAW IN AMERICAN HISTORY
Edited by Donald Fleming and Bernard Bailyn
Introduction by Byron R. White

From Harvard's Charles Warren Center for Studies in American History comes this brilliantly conceived, brilliantly edited addition to the Center's interpretive series. It is published at a crucial time: when the issues of law (and order) in American society not only deserve, but urgently demand, our most thoughtful attention.
$12.50 Associate's price **$10.95**

The Smithsonian Associates Book Service

330 West 42nd Street, New York, New York 10036 Dept. SM-5

Please send me the books I have circled:

1. 2. 3. 4. 5. 6. 7.

I understand that if after 10 days I am not satisfied with the books I may return them for a complete refund.

I enclose ☐ check ☐ money order in the amount $_____

Member's Name_____

Address_____

City_____

State_____ Zip_____

(Add 35¢ per book for shipping and handling, plus applicable taxes.)

By Patrick Ryan

Some tantalizing torments and Sisyphean sentences

Contemplated at a safe distance from their authority, the American judiciary appears ambitious to emulate Gilbert and Sullivan's Mikado. He declared melodiously that "My object all sublime/ I shall achieve in time—/To let the punishment fit the crime—/The punishment fit the crime." And related in example how the billiard sharp would be condemned to ply his nefarious trade "On a cloth untrue/ With a twisted cue/And elliptical billiard balls."

Such similarly direct retribution has lately been visited in the Los Angeles Superior Court against a professional pickpocket with 20 previous arrests. He was charged with spiriting $15.11 out of a lady's purse. In addition to a jail sentence, he was condemned, for the next two years, to wear mittens of a texture at least as heavy as eight-ounce duck whenever he promenades in any public place. At which the proud dip, a light-fingered practitioner of some 13 years, understandably headed for the hills. A warrant for his apprehension was still unfulfilled at last communiqué. "Dostoevsky," he cried in parting invocation, "thou shouldst be living at this hour!"

Like smog and eccentrics, this trend toward direct justice flourishes in the California climate. Offending motorists there have been condemned to spend ten days cleaning up glass fragments after car smashes, washing 50 road signs in expiation of ignoring one and visiting hospitals to check on the incidence of patients put there by car accidents. The intoxicated helmsman charged with maneuvering his motorboat dangerously was made to spend a week painting lifeguard stations and rescue ladders. Even gentle drunks found sleeping it off under the stars have been forced to sweep out the parks and beaches where they were discovered somnolent and harmless. Poetic justice is not so readily discernible to the legally unqualified in the punishment of a wealthy Californian who, for jumping a red light, was ordered to catch, clean and deliver 50 pounds of fresh fish to the Salvation Army.

This latter-day penchant for handing down bizarre sentences has some inspiration in antiquity. Take the punishments meted out to such as Tantalus and Sisyphus. The former, for various misdeeds including revealing the secrets of the Gods and serving his own murdered son to them in a banquet stew, was consigned to eternal thirst, standing in a pool of water which would recede whenever he bowed his head to drink (hence the word "tantalize"). Sisyphus, a legendary king of Corinth, still serves his sentence for greed, adultery and general knavishness. In the world of shades he laboriously rolls a mighty stone up a hill, only to have it slip from his hands when he gets to the top and plummet to the bottom.

Perhaps some similar forms of retribution might be recommended for those among us who perpetrate classical crimes against mankind today. For wanton pollutors a lead could be taken from Tantalus. Offenders could be condemned to stand in Lake Erie's sludge while industrial fallout patters down from the heavens about them and long, cool gin and tonics hover just out of their desperate swallows. Speed maniacs who labor to make life more horrible by inventing ever-faster vehicles would spend their afterlife on a moving pavement, so geared that no matter how fast they scamper they never actually leave the spot they're standing on. Manufacturers of amplifying equipment who help turn our days into sonic hell could be confined in soundproof rooms, alone and in utter silence.

Sisyphean sentences might be appropriate for builders who persist in deadening cityscapes with repetitive office slabs like giant fenestrated matchboxes. They could be given the task of constructing skyscrapers throughout eternity, which invariably collapse just as the last brick is being set in place.

And for all who encourage the persecution of quiet people by the telephone, fate would have in store a special hell. They would spend their hereafter surrounded by 500 phones, one of which rings incessantly. After having answered 499 and finally located the right one, they find it is a wrong number.

Let's not sign off, however, in tones of solemnity, but pass on a few words of cheer for the ham-handed, mittened-up pickpocket who set off this contemplation. He can continue his professional career if he follows the technical lead of his colleagues in Japan. The dips over there no longer rely only on their nimble fingers; they now use nitric acid sprays to rot the fabric of bulging hip pockets and follow the victim around till his wallet drops out. You can do that even full-gauntleted in eight-ounce duck.

EVEN IF THE SPORTABOUT WEREN'T THE ONLY WAGON OF ITS KIND, YOU'D STILL HAVE A GOOD REASON TO BUY IT.

When you buy a 1972 Hornet Sportabout, you get the only wagon made in America that gives you sleek, racy looks, a rear lift gate and 60.8 cubic feet of cargo space.

You also get a car that's been road-tested and checked over so thoroughly that we make this promise: If anything goes wrong and it's our fault, we'll fix it. Free.

And, if we have to keep your car overnight to fix it, over 1900 dealers will loan you a car. Free.

When you buy a new 1972 car from an American Motors dealer, American Motors Corporation guarantees to you that, except for tires, it will pay for the repair or replacement of any part it supplies that is defective in material or workmanship.

This guarantee is good for 12 months from the date the car is first used or 12,000 miles, whichever comes first.

All we require is that the car be properly maintained and cared for under normal use and service in the fifty United States or Canada and that guaranteed repairs or replacements be made by an American Motors dealer.

AMERICAN MOTORS BUYER PROTECTION PLAN

Finally, you get a name and toll-free number to call in Detroit if you have a problem. And we promise you'll get action, not a runaround.

Nobody in the business does all this for you after you buy a car.

Which is probably why people who've never bought a car from us before are buying one now.

JOHNNIE WALKER® BLACK LABEL 12 YEAR OLD BLENDED SCOTCH WHISKY, 86.8 PROOF. BOTTLED IN SCOTLAND. IMPORTED BY SOMERSET IMPORTERS, LTD., N.Y., N.Y.